



**THE NEW JOBS:
TRANSITION FROM COAL
TO A MODERN ECONOMY**

The new jobs: Transition from coal to a modern economy

CONTRACTING AUTHORITY:

“WWF – Bulgaria”



Representatives: Georgi Stefanov, Stanislav Yanev

Address: 19B Tsar Boris III Blvd, fl. 4, 1612 Sofia

CONTRACTOR:

„REGIOPLAN“ EOOD



Representative: **Assoc. Prof. Kosyo Stoychev, PhD**

Address: 88, Acad. Stefan Mladenov St., 1700 Sofia

Expert team

Head of Department „Regional and Political Geography“

“Social and Economic Development” Expert

“Social and Economic Development” Expert

Assoc. Prof. Kosyo Stoychev, PhD

Veselina Gospodinova

Chief Assistant Miglena Klisarova, PhD

Photos: Science in HD on Unsplash, Zbynek Burival, Matthew T Rader

Design and prepress: Taralezh Ltd.

Supported by:



Federal Ministry
for the Environment, Nature Conservation
and Nuclear Safety



European
Climate Initiative
EUKI

based on a decision of the German Bundestag

This study was prepared within the project “Just Transition in Eastern and Southern Europe.” The “Just Transition in Eastern and Southern Europe” project is funded by the European Climate Initiative Program (EUKI). EUKI is a financial instrument of the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety of the Federal Republic of Germany (BMU). Its implementation is supported by the German Society for International Cooperation (GIZ). The main objective of EUKI is to encourage cooperation on the issue of climate change within the EU in order to mitigate the consequences of greenhouse gas emissions. This is done by strengthening cross-border dialogue and cooperation, as well as by the exchange of knowledge and experience.

The information and opinions set out in this document belong to its authors and do not necessarily reflect the official position of the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety of the Federal Republic of Germany.

© 2021 WWF

All rights reserved.

Any reproduction, in whole or in part, of this report must include the owner’s name and the content rights.

ISBN 978-954-07-5252-5

TABLE OF CONTENTS

ABSTRACT	5
PART I. INTRODUCTION AND WORKING HYPOTHESIS	10
PART II. INTEGRITY WITH THE REPORT “JUST TRANSITION FOR THE COAL-MINING REGIONS IN SOUTHWEST BULGARIA: DEVELOPMENT SCENARIOS”	13
1. Coal-mining industry in the Southwest Bulgaria region	15
2. Geographic factors for new economic activities and jobs in Southwest Bulgaria	19
3. Structure and condition of Southwest Bulgaria	20
4. New jobs – the (im)possible alternatives	22
PART III. STRUCTURE AND CONDITION OF SOUTHWEST BULGARIA	31
1. The role of the strategic documents	31
2. Current regional and sectorial economic structure	34
PART IV. NEW JOBS – THE (IM)POSSIBLE ALTERNATIVES	42
1. Localization analysis – key assumptions	44
2. Central places, threshold level and range of the goods in the Pernik and Bobov Dol municipalities	49
3. Determining the minimum threshold level of the key businesses and services by settlements in the Pernik and Bobov Dol municipalities	56
4. Central places per W. Christaller – Pernik Municipality and Bobov Dol	60
5. Central places – market potential	63
6. Rank 2 Gravitational forces in the Southwest Region	66
7. Walter Isard’s Substitution Principle	75
8. Smith’s cost curves	78
9. Economies of scale and circular economy	80
PART V. ALTERNATIVE ECONOMIC ACTIVITIES	83
1. Preliminary requirements and conditions for the alternative and new economic activities and the development of the region after restructuring the coal-mining sector	83
2. Current development of the business in the region and good economic practices	84
3. Development scenarios	87
4. Comparative evaluation of the development scenarios	89
5. Provisions of the Programme „Regions in Transition” 2021-2027, Priority 3 “Just Energy Transition”	90

6. Provisions in the Recovery and Sustainability Plan of the Republic of Bulgaria, version 1.1. of February 2021	94
7. Recommended provisions of the report on the situation – localization analysis for creating alternative economic activities and jobs on the territory of the Bobov Dol and Pernik Municipalities	97
8. Analysis of the competitive advantages of the region	99
9. Conclusions regarding the coal-mining region of Stara Zagora	107

PART VI. CONCLUSIONS FROM THE REPORT 108

PART VII. SOURCES OF INFORMATION 112

LIST OF FIGURES

Figure 1	Stages of the report for just transition from 2018	14
Figure 2	Interrelations between the strategic planning documents, as per the RDA	33
Figure 3	GVA by tier 2 regions	34
Figure 4	GVA by economic sectors and tier 2 regions	36
Figure 5	GVA by economic sectors in the SWR, 2000, 2017, 2014	38
Figure 6	GVA by economic sectors by regions in the SWR, 2019	38
Figure 7	Dynamics of the job loss and creation process in the context of technological and economic transformation	43
Figure 8	Geographic situation of Bobov Dol Municipality	49
Figure 9	Geographic situation of the Pernik Municipality	50
Figure 10	(a) Hypothetical demand curve for a good (d). (b) Hypothetical demand cone for the same good. (per Dunn, 1954)	51
Figure 11	Saturating the market by a single manufacturer to market areas	53
Figure 12	Population distribution and density, 2019	55
Figure 13	Spatial orientation (Christaller, 1933)	64
Figure 14	Theoretical settlements distribution curve according to the „rank-size” rule	68
Figure 15	Distribution of settlements as a ruler „rank-size” in Pernik Municipality	69
Figure 16	Distribution of settlements as a ruler „rank-size” in Bobov Dol Municipality	70
Figure 17	Distribution of the 27 regional cities of Bulgaria, according to the „rank-size” rule	71
Figure 18	Transformation line for a localization problem with two options	75
Figure 19	Localization decision with three options (per W. Isard, 1956)	76
Figure 20	Area of transport costs with isotopes and isodapanes	78
Figure 21	Possible options of cost curves according to the manufacture model	81

LIST OF TABLES

Table 1	Forces, affecting geographic concentration (according to Krugman)	45
Table 2	Criteria for the localization conditions	48
Table 3	Population by settlements, 2011	54
Table 4	Threshold level and range of selected businesses in the Pernik and Bobov Dol municipalities	58
Table 5	System of central places with $k = 3$ for the Pernik Municipality (Christaller, 1933)	62

List of acronyms and abbreviations

NPP	Nuclear Power Plant
AMS	Automated Metering Systems
GDP	Gross Domestic Product
GVA	Gross Value Added
FG	Financial Grant
RES	Renewable Energy Sources
HPP	Hydroelectric Power Plant
GWh	Gigawatt Hour
SDA	Share Dynamics Analysis
VAT	Value Added Tax
EEA	European Economic Area
EC	European Commission
EU ETS	Eu Emissions Trading System
EU	European Union
FTPS	Factory Thermal Power Station
EEA	Executive Environment Agency
ICT	Information and Communication Technologies
AAQ	Ambient Air Quality
EAQ	Economic Activity Classifier
Kgoe	Kilogram(s) of oil equivalent
CHH	Cultural and Historical Heritage
CITUB	Confederation of Independent Trade Unions of Bulgaria
LC	Labour Confederation (Podkrepa – Support)
MWt	Megawatt ton
ME	Ministry of Energy
MEW	Ministry of Environment and Waters
SME	Small and Medium-Sized Enterprises
NEC	National Electricity Company
NIMH	National Institute of Meteorology and Hydrology
R&D	Research & Development
NSI	National Statistical Institute
UN	United Nations
GWB	Groundwater bodies
IIAHPP	Pumped Storage Power Station
DFI	Direct Foreign Investments
RIEW	Regional Inspectorate of Environment and Waters
AAQMA	Ambient Air Quality Management Area
ADR	Average Daily Rate
QS	Quality Standards
TWh	Tera watthour(s)
TPS	Thermal Power Station(s)
TNC	Trans-national corporations
DHPS	District Heating Power Station (district heating company)
FDP	Fine Dust Particles
SW	Southwest
SWR	Southwest region
NUTS	Nomenclature des unités territoriales statistiques* – Common Classification of the Territorial Units for Statistics
UNESCO	United Nations Educational, Scientific and Cultural Organization

* From French

ABSTRACT

“The cost of going green may be high, but if we do nothing, losses may be higher.”

Vivian Loonela

Historically, the job-creation has always been preceded by losing jobs. In global science and practice there is no univocal position on the decisions to be made in this process.

Currently, on a global level, among some of the most important factors for the job creation and at the same time for losing jobs, are:

- **the technological factor;**
- **the technological innovations, sub-divided into process and product innovations;**
- **the fragmentation of businesses and international division of labour;**
- **the number, level of education and habits of the population;**
- **the involvement in the global supply chains;**
- **the inherited structure of the economy;**
- **the natural resources;**
- **the collective learning skill and that for establishing adaptive communities of people and businesses.**

Of the utmost significance is the specific combination of these factors and the capability of the respective country to use its strengths, to derive more and better jobs from the division of labour and the specialization, and thus – higher income, standard of living and prosperity.

The report shows that the combination of factors for Bulgaria and the target territory of the Pernik and Bobov Dol municipalities, is characterized by certain specificities, but it is currently at a turning point of its economic and social development in the past century. **The gradual decline in industrial coal production (change in the energy system)¹ and the resulting electricity generation, has already reached the minimum possible levels, before the actual discontinuation of this activity, traditional for the region.**

1. 4 energy systems have changed up until now.

1. Water;
2. Coal;
3. Oil and Gas;
4. Nuclear.

Humankind is at the threshold of the fifth energy wave – Energy from renewable sources and hydrogen. The coal system is incompatible with the environmental targets, while the rest can continue to co-exist simultaneously in various combinations.

On a national level, Bulgaria is dominated by employees in the services sector, which is in indication of a post-industrial society, but on the other hand this employment structure is not the result of automation, electronization and robotization of the economy in the manufacturing sectors, but a part of a structural technological underdevelopment. The country is not in the post-industrial phase due to superb performance in the industrial phase, but rather due to structural changes at the end of the 20th and the beginning of the 21st century, of irreversible economic nature.

The data on Bulgaria show a high share of university graduates but with other than engineering degrees. This is a significant impediment to the development of the economic system towards innovations, technology transfer, improvement of the resource and energy efficiency on corporate level.

On local level, in Southwest Bulgaria, the Pernik and Bobov Dol municipalities are monostructurally dependant on coal production, electricity generation and ferrous metallurgy, as the Pernik municipality is currently in a much more favourable position, due to its close proximity to Sofia and the daily commute of people, living in that municipality, but employed in Sofia. This last factor preserves Pernik's good demographic indicators, but through the workforce, Sofia consumes most of its potential.

MAIN CONCLUSIONS

1. The social and economic costs and expenses are based on the technical and economic paradigms with a clear differentiation between evolutionary and revolutionary changes. **The logic of this report is based on the fact that the first economic transition, which commenced in Bulgaria in the beginning of the 1990s, was not based on the technical and economic paradigm, but rather it was a socio-political choice. The form of socio-political transformation, resulting in entirely new socioeconomic relations, distribution of the assets, wealth and the economic structure. This is an important condition for properly understanding the processes, detailed in the report. This is also the underlying cause for the main issue and challenge – that this socio-political choice has so far failed to establish a public mechanism, ensuring the inclusion of Bulgaria and its regions in the modern global and/or regional technico-economic wave, which would guarantee the more just development of the Bulgarian regions.** As a result, the country entered a state of serious regional disparities – demographic, social, sectoral, environmental. **It should also be noted that the target municipalities have been identified as municipalities with structural difficulties, and the Bobov Dol municipality is also identified as a rural municipality. The administrative regions, to which these two municipalities belong (Pernik and Kyustendil), experience the adverse demographic processes, characteristic for the entire territory of Bulgaria, but these are even more seriously manifested here.**



At present Stara Zagora manages to achieve good development in economic terms, reporting a process of already commenced economic diversification, **but the transition to alternative economic activities will affect an exceptionally large number of employees, as well as Bulgaria's main electricity generating facilities. These are two very serious challenges, which required proactive measures and solutions.**

2. The implementation of a just transition to clean, circular economy in the context of the European Green Deal, is viewed as the key counteraction to all potentially adverse processes. Investing in education, qualification and requalification is part of the solution with alternative employment for those, employed in the affected sectors. It is our understanding that this would be a process, which will show its benefits after at least 3 years. The expectations for the possible change on the labour market and employment, which would accompany the transition to a greener economy are investigated. We are steering the society towards reflection on and defining new “green” jobs, transformation of the current jobs into greener ones, as well as identifying the “green” workplace skills, which would be necessary for living and developing the society and the economy, while preserving the resources and the environment. It should be noted that the planned activities in the Regional Development Programme for programming period 2021-2027 (RDP), Priority 3 “Just Energy Transition”, incorporate eligible activities, repeating the word investments. These are only possible in appropriate investment environment, entrepreneurship proactiveness and readiness to take acceptable risks. In all other cases, public projects will dominate. However, these are not equivalent to investment and business environment for the much desirable micro enterprises.

3. The first report on the just transition for Southwest Bulgaria², the subsequent studies in Bulgaria³, the European semester⁴ and other documents reveal the scale of the forthcoming change. **In this respect, the approaches, used in other EU Member States, where just transition is being programmed (Czechia, Poland, Romania, Slovakia), are more difficult to apply on the territory of the Pernik and Bobov Dol municipalities, at least in the next 5 years. There are several reasons for that: higher level of depopulation, compared to all other regions, seriously impaired age and educational structures, and thus – quantity and quality of the workforce.** On the other hand, there is no productive and technological industrial environment, infrastructure is improving, although slowly, but logistics and business services are at very low level for the development of innovative and dynamic businesses. In most of the initial business initiatives, we will rely on well-known, traditional activities, which may start with the available people and their respective qualifications.

2. t.ly/9zJ1

3. Report on social challenges and re-skilling needs of the workforce solutions in the TRACER target regions, WP 3 – Task 3.5 / D 3.4 July 2020, TRACER website: www.tracer-h2020.eu

4. t.ly/DLvQ

4. The possible closing of the coal-fuelled electricity generation will result in the significant redundancy of those employed at these companies. This will also affect all the sub-suppliers, as well as the tax revenues in the respective regions, the social security and health insurance systems in Bulgaria. This is the most serious social challenge and will further contribute to the additional supply on the labour market, of workers with secondary education, which are often unable to find jobs at similar remuneration rates in other sectors in the same region or start a business of their own. Therefore, they fall in the group at the highest risk of emigration and further impairment of the demographic situation.

5. The multiplier effect⁵ regarding the number of employees, determined by the “input-output” tables for Bulgaria for 2015⁶ show that one job in the energy producing products sector supports at least 1,5 jobs in the other sectors of the economy. The multiplier for the electricity generation sector is established at 2,2 jobs. This shows the structure defining significance for both key economic activities in these regions. **Both sub-sectors on the territory of the three regions Pernik, Bobov Dol and Stara Zagora account for 15,6 thousand jobs. This value, when recalculated with the multiplier effect, will increase by at least 27,3 thousand more jobs. The direct and additional adverse impacts on employment, evaluated in the report, amount to at least 43 thousand jobs affected, as approximately 73% of them are in the Stara Zagora region.**

6. The identified delay in the development of the Bobov Dol and Pernik municipalities, suggests the need of a space-localization approach, which would contribute to a change in the concept for the economic development of this region. In this respect, an approach for space-time transformation with a combination of various economic activities has been applied. **An assessment was made of those, who will be affected by the transition to a clean, circular economy, in order to identify the sociodemographic profiles of the population, which will be directly or indirectly affected by the transition towards green economy and define the needs of new skills and support for the general principles of digitalization, circular economy, decarbonization, energy and resource efficiency, sustainable mobility.**

Based on this information and on the priorities for the economic development of the regions, regional plans for just transition are being developed. These will be based on activities to be incorporated in trainings for acquiring knowledge and skills, demanded on the labour market, applying tools for the evaluation and validation of competences in order to ensure alternative employment and entrepreneurship. **The trainings of the workforce will be focused on two key directions:**

- 1) ensuring basic portable knowledge and skills for using the resources and protecting the environment and climate, which are the basis for lifelong employability and flexibility to changes; and**
- 2) ensuring specific knowledge and skills, related to the successful practicing of professions, newly occurring green jobs or transformed jobs.**

5. A tool for determining and forecasting jobs, used in the report, to make projections for the future jobs, based on the current situation.

6. https://stats.oecd.org/Index.aspx?DataSetCode=IOTS14_2018

7. The identification of the sectors, which may change the socioeconomic reality is based on the principles of economies of scale, resource efficiency, *threshold level and scope of business, hierarchy of the system of towns and cities and their functions and Isard's substitution principle*⁷. The expected number of new jobs in micro enterprises is estimated at 150 for the Bobov Dol municipality, 700 for Pernik and over 2000 for Stara Zagora, and these can also be created through individual start-ups. All other workers must be reallocated to existing companies or newly-established small and medium-sized enterprises, a process, which – on the territories of Pernik and Stara Zagora – will be much easier to implement, compared to Bobov Dol.

Identified are micro- and small-businesses, which may start immediately with available capital, based on personal skills, traditions, existing buildings, by adding a high level of digitalization and internet exposure in all its forms. The most important factors for people's development, is the acquiring and enriching emotional intelligence and entrepreneurship, which refers mostly to the small towns and villages, where investments are scarce.

The report clearly differentiates the municipal centres from the villages, since the issues and solutions for the municipal centres are incompatible with the solutions for villages, even within the same municipality, which are additional spatial disparities. Stara Zagora is a large administrative region, with clearly differentiated northern part, dominated by the Kazanlak municipality and specialized in machine engineering, the regional centre – Stara Zagora, which is the economic core of the region and the southern part, hosting the coal-producing and electricity generation facilities. The solutions for Stara Zagora must ensure continued growth of the centre and a serious transformation on the territory of the Radnevo and Galabovo municipalities, aimed at alternative development.

8. The main proposition is the complete change of the attitudes towards existing resources – people, land, real estate, forests, waters, energy potential etc, along with developing completely new activities, *non-compliant with the principle of economies of scale*, which is the sole option that can ensure their survival in the current complex environment. The report focuses on:

- The formation of a territorial system, based on the internal division into one or several towns/villages of creative, green, socially-transforming and collectively learning communities, creating new value and organization of the life in these regions;
- Development of key competences and entrepreneurship in the following sectors: renewable energy, organic agriculture and organic foods, bioplastics, IT, resource efficiency (waters, biomass, treatment), circular economy, design.

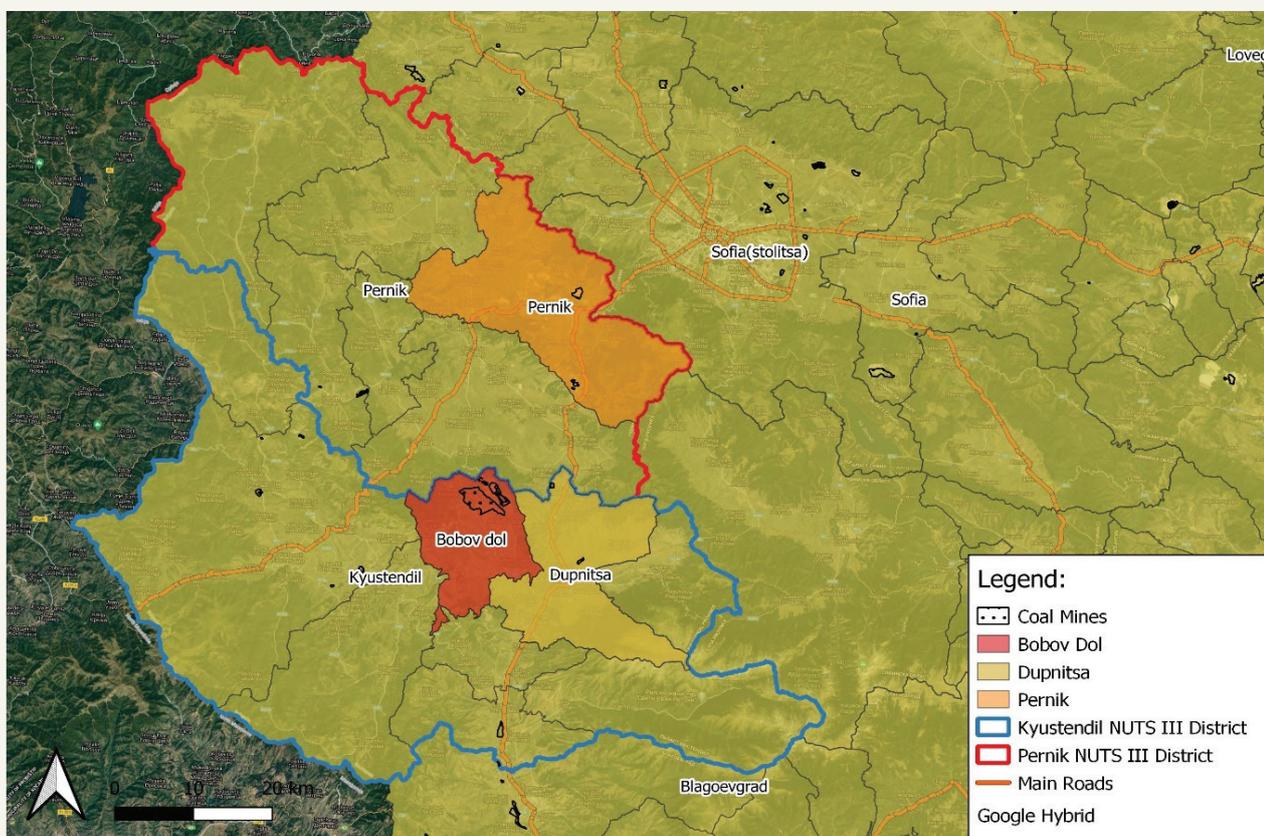
7. Stoychev, K. (2012) Localization approaches for regional development, University Publishing House "St. Kliment Ohridski", Sofia, ISBN 978-954-07-3398-2 – t.ly/sil1

PART I. INTRODUCTION AND WORKING HYPOTHESIS

The main objective of this report is to present a *situation and localization analysis for creating alternative economic activities and jobs* on the territory of the Bobov Dol and Pernik Municipalities after the discontinuation of the operation of the coal mining industry and of burning coal for electricity production.

Additionally, a comparative analysis and prognosis will be provided for the Stara Zagora region, as the key lignite mining region and main location of the Thermal Power Stations in the Republic of Bulgaria.

Geographic situation of the target territory



Source: Regioplan GIS analysis

The subject matter of the analysis includes **the concepts and models for performing localization analyses and studies**, assessing the feasibility, usefulness, effectiveness and environmental friendliness of the implementation of the new proposals, incl. several key localization approaches.

The object of the analysis is the **just socio-economic transition from coal mining and electricity generation from that coal to creating alternative new job opportunities**. They contain the required change of the socio-economic situation (transition), the management of the domestic and foreign migrations of the population and, respectively, the preservation of the functions and significance of the towns and villages, situated in the territories in transitions. The analysis is closely connected to the “industrial reconversion” concept, where the existing industrial facilities have exhausted their public usefulness and should assume a completely new application and new public value. At the same time, those of them, which cannot undergo reconversion (terrains, tailings ponds, mines, industrial buildings, etc.) must be utilized (recovered, forested, drained, demolished, etc.) and brought to a condition, which is not in conflict with the new businesses and environmental standards.

The sector of coal mining and electricity generation from the mined coal is incompatible with the following, exceptionally pressing concepts:

- zero-carbon economy;
- achieving climate neutrality;
- resource and energy efficiency;
- smart specialization;
- circular economy.

This poses significant challenges, in terms of the positive public perception and attitudes, readiness for a just socio-economic transition in the Kyustendil, Pernik and Stara Zagora regions. The reason for this is that *transition* requires complete discontinuation of the economic activities in the coal mining industry and the electricity generation from the mined coal in order to achieve the environmental objectives. This, therefore, may pose a risk of passive resistance and excessively slow phasing-out of the coal-dependency, under the pretext of high social significance.

Therefore, this report must stimulate a new type of economic logic, which would ensure complete discontinuation of non-environmentally friendly operations, while enabling the implementation of a just socio-economic transition for all three regions and a new perspective in Bulgaria’s regional economy.

When developing the analysis, the individual, unique features of each region were taken into consideration. Thus, this report aims at avoiding a programming approach of the type “*something for everyone*” applied in the implementation of the current operational programmes in the two previous programming periods (2007-2013 and 2014-2020). This outlines the comparative and competitive advantages of the regions and respectively, priority investments therein. This planning approach is the cause for the presence of omnipresent economic activities, multiple similar projects within the same programmes in the cities, towns and villages, with very similar project objectives. This approach solves major infrastructural problems and certain socio-economic contradictions, but is also the reason for the absence of an actual energy and socio-economic transition. Therefore, the operational programmes for development, funded by the EU should only play a supplementary, but not a key role⁸ in the transformation of the

8. At present the main funding is provided by the ESIF, and the national budget provides the necessary co-financing to the funds.

regional economic systems. They helped Bulgarian regions avoid entering extremely adverse development scenarios, but they also failed to ensure the catching-up development that is so very necessary for Bulgaria. According to a report, issued by the Open Society Institute – Sofia, at the current rate of development, Bulgaria will reach the average levels for the EU of the key development indicators in 24 years^{9, 10}.

Further considered were the Tier 2 characteristics of the Southwest region (SWR) of Bulgaria, which is the socio-economic leader in Bulgaria, due to the presence of the capital city Sofia in this region. At the same time, it is a cross-border region, also accommodating the largest share of high-mountain areas in Bulgaria, and having a relatively dense network of cities, towns and villages with four large, regional-centre cities, 52 municipalities and numerous smaller towns and villages. This provides both opportunities and a number of alternatives for the localization of economic activities. At this stage the localization of resources, production facilities and jobs are focused on the industrial areas and the central parts of the cities in the region. An exception to that rule are some businesses, based on localized resources such as the coal mining industry and the other types of mining and extraction of natural resources – fuels and minerals. This is an entirely natural process, which must be evaluated as early as this stage and re-programmed in the direction of localization in urbanized areas of a lower rank, according to the National Spatial Development Concept (NCSD). Such re-programming, evaluation and targeted policy will preserve their functions, will make it possible for these settlements to act as satellites of the regional-centre cities, thus preserving these regional centres themselves in the long term, because these will be provided with alternative locations, resources and workforce.

The report tries to answer the following top-priority questions:

- Which economic activities would be suitable to act as new and substituting activities?
- How many of them would be realistic for the transformation of the coal-mining regions and would provide the necessary social, economic and environmental sustainability?
- Do these new activities have alternatives/substitutes – territorial, product, commercial?
- Which are the domestic resources, factors and advantages, which would preserve the investments and add value to the new jobs?
- How would Sofia's agglomeration shadow be overcome and the resources and investments would be distributed in a more just manner?

WORKING HYPOTHESIS OF THE REPORT:

Targeted planning and investments to be applied in regions with structural difficulties – the Pernik and Bobov Dol Municipalities, with significant role of the old-industry operations, social and environmental risks, in order to achieve a just transition and change the regional economic perspectives, specialization and direction of development.

9. <https://osis.bg/?p=2591&lang=en>

10. https://osis.bg/wp-content/uploads/2018/05/convergence-final_May2018.pdf

PART II. INTEGRITY WITH THE REPORT “JUST TRANSITION FOR THE COAL-MINING REGIONS IN SOUTHWEST BULGARIA: DEVELOPMENT SCENARIOS”¹¹

The localization and situation analysis for building a new economic perspective and sustainable jobs in the coal-mining regions of Southwest Bulgaria, was developed as part of the “*Regions and municipalities for just transition*” project, which is being implemented by the international wilderness preservation organization WWF, with the involvement of WWF Germany (lead partner), WWF Poland, WWF Greece and WWF Bulgaria, supported by WWF’s European Policies Office in Brussels (WWF EPO).

The document is a natural extension and upgrade of the performed in-depth socio-economic analysis and the development of Just transition for the coal-mining regions in Southwest Bulgaria, within the “*Just transition in Eastern and Southern Europe*” project, funded through the European Climate Initiative programme (European Climate Initiative – EUKI) on behalf of the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety.

The report “*Just transition for the coal-mining regions in Southwest Bulgaria: Development scenarios*”¹² presents a concept with three scenarios for a social and just transition in Southwest Bulgaria, where the economic activities coal mining and electricity generation from coal burning, take place. The concept aims at being established as an integral part of the low-carbon policies at both national level, and at EU level.

Both the just transition concept, and this localization and situation analysis for building a new socio-economic perspective and sustainable jobs in the coal-mining regions of the SWR, are based on the notion of “*just transition*” – “*just transition*”^{13, 14}, used in the sense, set out in the conceptual framework for just transition of several key documents:

11. https://d2ouvy59p0dg6k.cloudfront.net/downloads/web_spravedliv_prehod_osnoven_doklad_prilojenia_low_res.pdf

12. https://wwfeu.awsassets.panda.org/downloads/web_spravedliv_prehod_osnoven_doklad_prilojenia_low_res.pdf

13. <https://www.oecd.org/environment/cc/g20-climate/collapsecontents/Just-Transition-Centre-report-just-transition.pdf>

14. http://www.ilo.org/global/topics/green-jobs/news/WCMS_475064/lang-en/index.htm

IMPLEMENTATION
OF THE PARIS AGREEMENT
COULD CREATE
2 MILLION
JOBS IN EUROPE

- The Paris Agreement, where the signatory parties agree as follows: “... Taking into account the imperatives of a **just transition** of the workforce and the creation of decent work and quality jobs in accordance with nationally defined development priorities development priorities.”, and further requires that “National climate change plans, including only transitional measures with a central principle of decent labour conditions and quality jobs”, as well as “...the transitions towards environmentally and socially sustainable economies ... to become a strong drivers for new jobs creation, social justice and poverty elimination. “Greening” all enterprises and jobs, through the introduction of more energy efficient practices, avoiding pollution and managing natural resources through innovations, improving sustainability and generation of savings, which would incentivize new investments and employment.”¹⁵;
- A document, developed by the International Labor Organization¹⁶, specifically focusing on the following content “...**Just transition** ensures sustainability of the environment, as well as decent jobs, social inclusion and eradication of poverty”.

The concept for “just transition” enables the transition to low-carbon economy in a responsible and just manner, through caring for people, especially those, who have lost their jobs and income, such as the workers in the thermal power and the coal mining industries. The burden of the transition must be distributed among the stakeholders and affected parties, and the leading principles must be those of responsibility and the opportunities for re-investments and restarting the regional economic structure. This is the only way forward, which can ensure transition towards a sustainable economy, which is at the same time just to the affected businesses and workers, and to the rest of the economy, including outside the target region and the environment.

The decarbonization policies and measures can in fact drive a sustainable economic growth and social advancement. This must take place with the active participation of the employees and workers, who are the most affected parties.

The concept for just transition in Southwest Bulgaria has the following **objectives**:

Analysis of the problems of the transition from coal-based industry to sustainable economy in Southwest Bulgaria (at level NUTS II, excluding the City of Sofia)

Planning the future of coal-mining regions in Bulgaria, in order to phase out coal-dependence

Transforming the plan for just transition in Southwest Bulgaria into a method for political planning and making long-term strategic decisions

Figure 1
Stages of the report for just transition form 2018

15. Quoted note.

16. Guidelines for a just transition towards environmentally sustainable economies and societies for all, Copyright © International Labour Organization 2015, First published (2015), ISBN 978-92-2-130627-6 (print) 978-92-2-130628-3 (web pdf)

The report “*Just transition for the coal-mining regions in Southwest Bulgaria: Development scenarios*”, based on which this localization and situation analysis for building a new economic perspective and sustainable jobs was developed, discusses the economic development opportunities, detailed in three scenarios:

- **The first scenario of status-quo preservation** is extremely insufficient for effecting changes in the social-economic condition of the region, the demographic trends and investment climate. It is believed that this scenario would result in unplanned closing of the energy and coal mining industry in its current form, which is in conflict with the objectives of the just transition towards a green-energy based economy. Such development is not recommended;
- **The second scenario, based on the domestic resources and advantages of the region** provides for an economic and territorial transformation. Such transformation must overcome coal-mining and burning, while preserving regional economy. This scenario is much closer to just transition objectives;
- **The third scenario of the “creative upgrade” with the involvement of external investors** is the most favourable one for the target region. This scenario provides for a complete economic and territorial transformation, overcoming the negative demographic trends and establishment of a favourable investment climate – factors, which may ensure a proper just transition.

One of the key objectives of both the just transition concept, and of this localization and situation analysis is to initiate active public discussion, which would catalyse decisions of a highly intellectual level, based on the advantages of the region. The main objective is to gradually overcome the depopulation and depersonalization of the territory (“pockets” of depopulation, poverty and structural retardation), as well as catalyse well as to ensure the formation of prosperous and attractive areas for the development of sustainable economic activities, new jobs creation and settling of new population.

1. COAL-MINING INDUSTRY IN THE SOUTHWEST BULGARIA REGION

The analysis of the general economic situation of the coal-mining industry and the electricity generation from the mined coal in the region of Southwest Bulgaria identifies the problematic areas in the sector and the perspectives for transformation and development towards alternative economic activities. The inherited spatial structures of these economic activities define the starting conditions in the development of the localization and situation analysis, which will be used to plan the opportunities for a new economic perspective and create sustainable jobs.

During the 20th century, as well as in the beginning of the new millennium, economic growth was due to the development of technologies and the improved efficiency in the incorporation of new energy sources. The most important component for the preservation of economic growth is the smart energy mix management for the respective community and the approaches to the optimization of its internal structure.

Energy is the key economic sector, determining the level of development and effectiveness of absolutely all the other economic sectors. An important feature of this specific situation is that coal mining and their burning for the generation of electricity must be discontinued within a very short timeframe, as this is happening in other countries that are developing and will implement territorial plans for just transition – Greece, Slovakia, Latvia, etc. This gives rise to a risk of temporarily high unemployment levels and adverse impact on certain social indicators, incl. emigration and elevated depopulation of the affected municipalities for a period of at least two years. In addition, these regions and municipalities did not stand out with particularly favourable economic and demographic structure, even before the phasing out of these activities. Therefore, the activities and measures for the prevention and management of these risks must commence immediately, which will ensure just transition in socio-economic respect.

At least two strategic approaches are possible with respect to the optimization of the system of energy and the socio-economic environment:

- **First**, the most socially resilient social groups and the representatives of the various middle-class categories, owners of individual luxury houses, hotels, restaurants, public access facilities – retail centres, cinemas, etc., would be incentivized to reduce their energy dependence from the central energy grid. The objective here would be to make sure that they satisfy most of their needs independently or using minimum amounts of energy from the central grid (electricity and thermal energy through energy neutral and smart buildings). In this way, the involved households, public buildings and businesses will reduce their energy intensity, which will result in releasing energy for the business and public needs, which will be able to implement similar measures within a longer timeframe. This will release energy and financial resources for use in energy support programs for socially vulnerable groups¹⁷;
- **Second**, all the energy, generated within the national electricity system and mix, will be directed towards businesses and public structures, which will use it for producing added value. Electricity market liberalization can contribute to such a policy. This action will achieve net cash flows and revenues, which will make it possible to pay a higher electricity price, without inflating the market, which would constitute a real growth and a factor for stability in the electricity sector. Thus, industry will have an incentive to invest in technologies, which will be used to reduce its energy intensity, and not wait for that to only happen through projects, based on Financial Grants (FG).

Currently, this transition in Bulgaria is being postponed for the following reasons:

- Implementation of a state-wide policy, encouraging growth in energy generation in order to “ensure acceptable social cost”; and
- The low rate of return on equity and long investments buy-back period in traditional energy resources “make it necessary” to ensure the absence of competition in the form of the alternative energy sources for a rather long period of

17. At present procedure No. BG16M1OP002-5.003 “Measures to improve ambient air quality” under priority axis 5 “Ambient Air Quality Improvement” of Operational Programme “Environment 2014-2020” applies a logic, supporting households, using hard fuel for heating.
http://ope.moew.government.bg/files/useruploads/files/nasoki_measures_air_0512.pdf

20-30 years. Another evidence for this is the quality and security of the electricity transmission grid, the maintaining of the required voltage and power for a number of cities, towns and villages, the reaction times and the timely repairs of failures, etc.

The fact that Bulgaria does not take into consideration its internal regional specificities, in developing its energy policy, as well as that a significant portion of the energy facilities in the country have not yet reached a significant operation lifetime (i.e. there are no significant market incentives for innovations in the energy sector on a national level), lead to a major delay in the undertaking of measures, which are at present more the result of the international pressure, exerted by the European Commission, international treaties, NGOs and various other associations.

On the other hand, since the conventional energy capacities still manage to maintain the current economic growth – an important part of the economic turnover of Bulgaria, the process of substituting one type of energy resources for another, requires significant investments. In fact, the change in the energy paradigm will be an example of the rule “creative destruction”. This will give rise to the emergence of new businesses, which have not existed previously – production of devices, equipment, instrumentation, components and infrastructure for electricity generation from RES and their servicing and software, as well as the most important consequence – reduction in the quantities of energy used for the production of a unit of product or service. At the same time, there will be significant development of the technologies, related to construction materials, contributing to energy and heat economy in the buildings until they become “passive” buildings – resource and energy efficiency. The businesses, involved in the manufacturing of all sorts of devices, using electricity, will have to apply cutting-edge technologies, which would ensure reduced electricity consumption by every device or piece of equipment. This will preserve the quantity and quality of usefulness, which consumers expect to obtain, but at much lower energy levels and, respectively, higher acceptable cost elasticity per unit of energy.

In short, energy transition and the restructuring of this sector must depend mostly on the level of energy intensity, the need of energy and the cost per unit of energy for the individual consumer – households, companies, public institutions. In this respect, the responsible institutions must focus their efforts on two sets of measures:

- **First set** – measures, ensuring direct reduction of electricity and thermal energy consumption, while preserving the usefulness and living comfort levels;
- **Second set** – measures, ensuring improvement of the usefulness and reduction in carbon intensity, as well as market incentives for energy intensity improvement.

At present, the economic situation of the coal-mining industry in the Southwest Bulgaria region and on a nationwide level is, as follows:

- Coal and coal-based fuels account for 31.3% of the Total Energy Balance (TEB), as 3.08% of these are imported coal and coal-based fuels;
- Bulgaria chiefly uses its own coal and coal imports play no major role in the energy balance;



**AIR MONITORING DATA
SHOW THAT THE MAIN
POLLUTANTS IN SWR ARE
SULFUR DIOXIDE
AND DUST**

- RES account for approximately 7.4% of the total gross domestic consumption in the TEB, as this number includes the functioning HPPs;
- The two electrification TPSs, situated in Southwest Bulgaria, use coal; as the main fuel (as well as Refuse Derived Fuel (RDF)) and take a major share in the total electricity generation in Bulgaria, since their combined installed capacity amounts to 45% of that of TPS “Maritsa East II” (the largest installed capacity in Bulgaria), 58% of that of TPS– Varna (second largest installed capacity) and 81% of that of TPS “Maritsa East III” (third largest installed capacity);
- The closing of TPS “Bobov Dol” and TPS “Republika“ – Pernik will result in the need of compensation of 903 781 MWh of electricity per annum, using alternative sources. Further analysis is required to prove if this amount of electricity is even necessary for the Bulgarian electricity system, but this falls beyond the scope of this report.

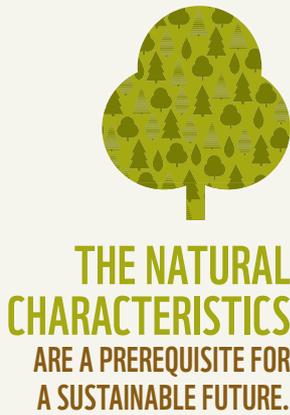
In the context of localization and situation analysis for building a new economic perspective and sustainable jobs in the coal-mining regions of Southwest Bulgaria, along with the current condition of the economy, the following challenges, which could be transformed into development potential, should also be taken into consideration:

- After shutting-down individual mines, a lot of social, environmental and spatial development issues arise, all requiring adequate solutions, incl. actions for the recultivation of terrains, water catchments of surface and ground waters, etc., in order to reduce the emissions, polluting waters, soils and the air. Ensuring compliance with the “polluter pays” principle;
- Coal mining and use – EU-wide – is an economic activity, subject to significant reduction and restructuring in the long term, in accordance with the objectives of the EU¹⁸ by 2050, which, considering the fact that Bulgaria is coal-dependent for electricity generation, requires planning and finding alternative primary energy sources;
- The risk of implementation of the energy and social transitions and restructuring of the economic profiles of the affected regions, due to the monostructural nature of the primary energy sources, may only be overcome through the implementation of technological innovations, development of alternative economic activities, incl. sustainable jobs creation.

The economic situation, regarding coal and the coal-mining industry in the Southwest Bulgaria region will definitely be affected by the European multidisciplinary objectives and priorities (environmental, social, educational, financial) in the area of climate and energy and the just transition concept, which in itself is a serious challenge for their implementation. The Bulgarian institutions and society must select and implement policies, which not only achieve the EU objectives, but are also in line with the specificities on both national and regional level.

18. <https://ec.europa.eu/energy/en/topics/energy-strategy-and-energy-union/2050-energy-strategy>

2. GEOGRAPHIC FACTORS FOR NEW ECONOMIC ACTIVITIES AND JOBS IN SOUTHWEST BULGARIA



Southwest region’s geographic characteristics define the structure and development of new economic activities, which ensure sustainable jobs. This section summarizes the key resources and specificities of the region, which are directly related to the development of the situation and localization analysis and which form the local competitive and comparative advantages of the target territory.

2.1. Geographic characteristics

The territory of the Tier 2 Southwest region is situated in diverse natural landscape regions and occupies 18,3 % of the territory of Bulgaria, having an extremely varied topography (incl. low-, medium- and high-mountain areas), a wide variety of mineral resources and fossil fuel deposits, three climatic regions, a multitude of mineral springs, different soil types and significant reserves of forest resources.

From analysis’ perspective, the following geographic characteristics are of major significance:

- The main source of fossil fuels in the region are the established coal deposits – lignite and (anthracite – phased-out mine in Svoge);
- Coal mining and the related electricity generation, as well as the recently boosted construction of HPPs and MHPPs have negative impacts on the environment and the terrains, where these activities take place;
- The diverse topography of the target territory favours the development of alternative economic activities:
 - Various types of agriculture;
 - Pasture and enclosure stock farming;
 - Forestry and bio-industries;
 - Tourism (incl. balneotherapy and SPA);
 - Smart industries and software companies, etc.;
 - Electricity generation from RES.

2.2. Environment

The main characteristics of the region, related to the environment, which have impact on the situation and localization analysis for development of new economic activities and creating sustainable jobs, are as follows:

- The identified climate change trends (incl. more frequent natural disasters – draughts, floods, hailstorms, as well as extreme weather events) in the recent decades globally, also apply to the Southwest Bulgaria region, which gives rise to a number of adverse consequences for the economy (in particular agriculture and the various ecosystems), the quality of life of the population, infrastructure;
- The high concentrations of dust, up to 10 µm (FDP10) are the result of the electricity generation from coal and RDF, road traffic and the presence of vast surface sources of pollution (unutilized tailings ponds, cinder and fly-ash embankments, etc.).

These are adverse factors, having negative impact on the quality of life of the population and the decisions of individuals and families to remain and continue their lives in the region, and, respectively, on the potential numbers of the workforce, which would be able to carry out the alternative economic activities;

- In general, the quality of surface and ground waters in the target territory is evaluated as being good, which is a positive factor for the development of agricultural activities. At the same time, the more frequent draughts and the decrease in snow cover have direct impact on growing various crops, as well as on the development of winter sports and tourism;
- The review of the natural risks and disasters in the area of Southwest Bulgaria, shows that the most likely natural hazards and risks are landslides, floods, forest fires and to a certain degree – seismic risk, which have an impact on the situation of individual economic activities at certain locations, especially those, requiring high degree of protection against natural and environmental risks;
- The target territory has a significant number of protected territories and natural landmarks, contributing to the development of various types of tourism, organic farming, organic animal production, sustainable forestry, fishing, but at the same time require that the economic activities are all compatible with the conservation of valuable species, habitats and nature in general.

These factors and risks, as well as the possible locations for their occurrence in the target territory, should be taken into consideration, when making decisions for the situation of the alternative economic activities, which will result in creating sustainable jobs, only if these provide a high level of security and the potential for preservation of the durability of the respective location.

3. POPULATION AND DEMOGRAPHIC PROCESSES

The population and its demographic characteristics¹⁹ are a key factor for development. The demographic analysis shows the number, qualification and specialization of the workforce, on which can individual economic sectors may rely for their functions and development. The number and income of the population determine the consumption of goods and services within the respective territory, respectively – the need of presence of basic and auxiliary services (incl. health, social, educational, cultural and other services), which determines further jobs creation.

The negative trends in the demographic processes observed on nationwide level are also manifested on the lower territorial levels in Bulgaria – regional, municipal, local. The adverse processes of depopulation, aging, declining reproductive attitudes and unstable social security of the population are defining features in the development of a large portion of the territorial units. The simultaneous manifestation of these adverse processes has an overall negative impact on the future demographic development of the territorial units and poses a risk to all potential future investments, and can also be the reason why these may never take place.

¹⁹ Population number and density, birth rate, death rate, natural and mechanical growth, sex, age, ethnic, professional and educational structure of the population.

3.1. Socio-economic indicators of the population

A detailed analysis of the socio-economic indicators of the population of the reviewed territory is presented in the *“Just transition for the coal-mining regions in Southwest Bulgaria: Development scenarios”* Report. For the purposes of this document, the following key conclusions, regarding the target territory, need to be outlined:

- The data regarding the dynamics of the population in both regions (Pernik and Kyustendil) reveal trends of great concern, regarding the demographic development, incl. negative natural and mechanical growth, exceeding the average levels for Bulgaria and the SWR, aging of the population, depopulation, decline in the number of people at active age, increased share of the people over the active age;
- The Pernik and Bobov Dol municipalities will continue to experience the strongest adverse impact, if the current demographic trends and estimations continue. This means that failing to undertake adequate measures, the estimations, regarding the number of the population in the Pernik and Kyustendil Regions according to 3 scenarios (pessimistic, adjusted optimistic and realistic), will come true according to the most adverse, pessimistic scenario, which will further aggravate the demographic and socio-economic crisis in the target territory;
- The future restructuring the energy sector and transition towards a green-energy based economy would most significantly affect the workforce and the migration processes, involving the employed and their families in the target municipalities, where there is already a problem with the redundancies of those, employed in the coal and coal-mining industry;
- In order to restrain the negative trends of depopulation of the towns and villages in both municipalities, it is necessary to undertake urgent measures to retain the workforce in the region through providing employment in other sustainable economic sectors. The acceleration of the implementation of these measures, will mitigate the risk that future investors are faced by an acute shortage of employees and the need to recruit such employees from other regions, cities, towns and villages;
- The current structure of the education level of the employed in the target territory (predominantly people of working age, of secondary or lower education) makes it clear that future investors or newly-emerging micro and small businesses, will be able to mainly rely on workforce, providing productions of low to medium technological complexity or those that are largely automated, involving repetitive operations;
- In the absence of effective measures to improve the level of qualification and the skills of the workforce (working habits, labour discipline, labour health and safety, etc.), the region will not be able to rely on specialization in high-tech productions and the implementation of innovations, which would limit its potential for development, and the adverse demographic trends would retain their rates.

4. SOCIO-ECONOMIC DEVELOPMENT

4.1. Summary results of the SDA

The summary results of the Share Dynamics Analysis (SDA) of the Pernik and Kyustendil regions, made in the “*Just transition for the coal-mining regions in Southwest Bulgaria: Development scenarios*” Report are presented below:

Region	Employed			Sectors as per EAQ-2008 with a growth in the number of employees in 2011-2016	Sectors as per EAQ-2008 with a decline in the number of employees in 2011-2016
	2011 (number)	2016 (number)	rate (%)		
Pernik*	28 396	27 148	- 4,4%	<ul style="list-style-type: none"> • Growth in sectors: A, E, H, J, K, M, Q, S • The largest growth was observed in sectors: E – “Water supply; sewerage services, waste management and remediation activities” (28,1%) and H – “Transporting, Storage and Posts” (20,6%) 	<ul style="list-style-type: none"> • Decline in sectors: C, F, G, I, L, N, O, P, R • The largest decline was observed in sectors: F – “Civil engineering” (-13,7%), N – “Administrative and auxiliary activities” (-13,6%) and R – “Culture, sports and entertainment” (-13,2%)
Kyustendil*	32 269	30 241	- 6,3%	<ul style="list-style-type: none"> • Growth in sectors: A, H, N • The largest growth was observed in sector: A – “Agriculture, Forestry and Fishing” (65,4%) 	<ul style="list-style-type: none"> • Decline in sectors: C, E, F, G, I, J, K, L, M, O, P, Q, R, S. • The largest decline was observed in sectors: L – “Real estate activities” (-41,5%), J – “Creation and distribution of information and creative products; Telecommunications” (-37,6%) and K – „Financial and insurance activities“ (-30,6%)

* The data for sectors B – „Extractive industry” and D – “Electricity, Thermal Energy and Gaseous Fuels Generation, Production and Distribution” fall in the category “confidential” according NSI’s rules and policy.

The following conclusions were made, based on the SDA:

CONCLUSIONS:

- Pernik Region sees an increase in the number of employees in sector “Water supply; sewerage services, waste management and remediation activities”, but a decline in three key sectors, incl. “Civil engineering”;

- Kyustendil Region is in a more difficult position, compared to the other regions in the SWR, only achieving growth in sector “Agriculture, Forestry and Fishing”. **From social and economic perspective launching a new type of economic growth in this administrative region will be the most difficult, since the most adverse demographic processes are observed here.**

4.2. Summary results of the Multiplier Effect

The calculations regarding the employed in the extractive industry and the multiplier effect, as well as the conclusions and recommendations, contained in the „Just transition for the coal-mining regions in Southwest Bulgaria: Development scenarios” Report are, as follows:

SCENARIO 1

Region	Em- ployed in sectors B and D (num- ber)	Conser- vative as- sumption regarding the em- ployed in sectors B and D (%)*	Employed in the ex- traction industry. (% of the total number of the popula- tion)	Pessimistic scenario of the multipli- er (number of the popu- lation)	Realistic scenario of the multipli- er (number of the popu- lation)	Structural change in the employment in the extractive industry (num- ber of employ- ees)
Calculations Algorithm	(1)	(2) = (1)*%	(3) = (1)/(5)%	(4)	(5)	(6) = (4)*(2)*(3)
Kyustendil	3055	50%	2,94%	58 094	103 764	854
Pernik	1434	50%	1,29%	74 332	110 626	479
Total	4 489	-	2,09%	132 426	214 390	1 333

CONCLUSIONS FOR SCENARIO 1:

- **Scenario 1** requires the resolving of the social problem, related to finding new jobs for 1 333 people.
- The absence of sufficient socio-economic alternatives will prevent a sustainable economic growth, which would keep the population in the region and overcome emigration attitudes. This means that a significant share of these newly redundant workers and their families will emigrate to another part of the Bulgaria or abroad;
- Business, even in its current structure, will have to rely on ever increasingly limited labour resources and business environment, dominated by companies that apply no environmental policies and alternatives;

- The Kyustendil and Pernik Regions will confirm their positions as the most-depressive ones in socio-economic respect and will not be able to achieve sustainable transition to a low-carbon economy.

SCENARIO 2

Region	Employed in sectors B and D (number)	Conservative assumption, about people employed in sectors B and D (%)*	Employed in the extractive industry (% of the total number of the population)	Realistic scenario of the multiplier (number of the population)	Structural change in the employment in the extractive industry (number of employees)
Calculations Algorithm	(1)	(2) = (1)*%	(3) = (1)/(4)%	(4)	(5) = (4)*(2)*(3)
Kyustendil	3055	50%	2,94%	103 764	1 525
Pernik	1434	50%	1,29%	110 626	714
Total	4 489	-	2,09%	214 390	2 239

CONCLUSIONS FOR SCENARIO 2:

- **Scenario 2** will transform the labour market providing alternative employment for 2 239 people in sectors outside of the coal-mining industry;
- The development of new socio-economic alternatives will ensure sustainable economic growth, which would keep the population in the region and overcome emigration attitudes. This means that a significant part of the newly redundant workers will find new jobs on the labour market in the region;
- Business will be able to rely on permanent labour resources and a better business environment, composed of SMEs, offering new products and applying environmental protection systems;
- The Kyustendil and Pernik Regions will be transformed in socio-economic respect and will be capable of launching the sustainable transition to low-carbon economy;
- Entrepreneurship in micro, small and medium-sized enterprises in alternative sectors will be the key factor for changing the socio-economic structure of the region, which means that there will also be new attitudes towards employment, qualification of the workforce and social dependence;
- A significant part of the emerging businesses will be orientated towards applying systems and solutions, based on RES, high energy efficiency, recyclable products, etc., directly related to the fulfilment of EU's climate goals;
- Scenario 2 will effectively utilize to a large extent the competitive advantages of the region, which will ensure sustainability of the investments and security of income;

- This scenario will have a direct impact on the technologies and innovations in the SMEs, both from organizational and from energy and social perspective;
- The Pernik and Kyustendil Regions will require the most and resources for the implementation of this scenario.

SCENARIO 3

Region	Em- ployed in sectors B and D (num- ber)	Conser- vative assump- tion, about people employed in sectors B and D (%)*	Employed in the extractive industry (% of the total number of the popula- tion)	Adjusted optimistic scenario of the multipli- er (number of the popu- lation)	Realistic scenario of the multipli- er (number of the popu- lation)	Structural change in the employment in the extractive industry (num- ber of employ- ees)
Calculations Algorithm	(1)	(2) = (1)*%	(3) = (1)/(5)%	(4)	(5)	(6) = (4)*(2)*(3)
Kyustendil	3055	50%	2,94%	158 306	103 764	2 327
Pernik	1434	50%	1,29%	166 602	110 626	1 074
Total	4 489	-	2,09%	324 908	214 390	3 401

CONCLUSIONS FOR SCENARIO 3:

- **Scenario 3** will fully transform the labour market providing alternative employment to 3 401 people in sectors with high added value outside the coal-mining industry and the related industries;
- Creating new socio-economic alternatives will ensure sustainable economic growth, which will increase the population in the region and contribute to the development of immigration attitudes. This means that all the newly redundant workers will find new jobs on the labour market in the region, and a major part of them will be employed in international companies;
- Business will be able to rely on increasing labour resources and a favourable business environment, composed of SMEs, as well as large companies, offering new products, new high-tech productions and applying environmental protection systems;
- The Kyustendil and Pernik Regions will be transformed in socio-economic respect and will be capable of launching the sustainable transition to low-carbon economy;
- Entrepreneurship in micro, small and medium-sized enterprises in alternative sectors, as well as the major investors in high-tech and high added value sectors will drive the change of the socio-economic structure of the region. A completely new type of employment will emerge, where income will mainly depend on the qualification of the workforce, a the social dependence will be overcome;

- A large portion of the newly emerging businesses will be orientated towards applying systems and solutions, based on R&D, new technologies, RES, high energy efficiency, recyclable products, etc., directly related to the fulfilment of EU’s climate goals;
- This scenario will have a direct impact on the technologies and innovations in SMEs, major companies, both from organizational and from energy and social perspective and will develop a network of clusters and corporate-type of science with direct application in business.

The multiplier effect regarding the number of the employed in scenario 3, which coincides with the transition to climate neutral economy, as defined through the “input-output” tables for Bulgaria for 2015²⁰ that one job in the energy products extraction sector supports at least 1,5 jobs in other economic sectors. The multiplier for the electricity generation sector is specified at 2,2 jobs. This proves the structural significance of both main economic activities in these regions.

Both sub-sectors on the territories of the two regions Pernik and Bobov Dol have to ensure direct employment of 3 401 people. According to data from the European Semester in sectors B and D in the Stara Zagora region there are 12 500 jobs. The total number of the directly affected employees is 15 901. According to this logic, this value, applying the multiplier effect, will be increased by further 27,3 thousand jobs in other sectors. The direct and additional adverse effects on employment, assessed in the report, show at least 43 thousand jobs affected, as about 73% of them will be in the Stara Zagora region.

4.3. Spatial behaviour and development

The regional economy and living conditions are characterized by a high degree of specific spatial organization. Their morphology is the result of the nature of:

- the spatial behaviour of manufacturers, with view of the goods and services demanded and supplied;
- the spatial behaviour of the population as both manufacturer (the workforce, recruited by manufacturers), and consumer of such goods and services; and
- the business development and living environment, established by the government at a certain location.

Thus, the spatial economic system may be defined as a complex network of interacting components – resources, infrastructure, consumers and manufacturers, interconnected by flows of goods, services and people. It functions as a whole unit, where each part plays a certain role in the functioning of the system and no part is fully independent from the rest. A change in the functions of one of the parts in such a system will have direct impact on every other part and on the entire system

20. https://stats.oecd.org/Index.aspx?DataSetCode=IOTS14_2018

as a whole. This means that the closing of the coal-mining industry and the related industries in the target territory, without transformation towards sustainable economic activities, where the workers made redundant would find alternative employment, will result – through the Multiplier Effect – to depopulation of entire towns and villages, reduced consumption and dying out of other production facilities and services, satisfying the main needs of the households. Therefore, the currently existing spatial organization of the regional economy and living conditions may be transformed in two directions:

- 1) **In the absence of measures for creating alternative economic activities and sustainable jobs**, creating further socio-economic vacuum in the reviewed region, which will be hard to remedy in the long term, due to the fact that even with investors’ interest, there will be an acute deficit of workforce, which could be used to implement the investment intentions; and
- 2) **By applying the just transition concept**, limiting the adverse consequences of closing the coal-mining industry and the related industries, preserving the basic economic system and living conditions in the target territory, and in the long-term – creation and development of a new type of economic activities, which will enable both the provision of employment to the local population, and improvement of the quality of life through investments in more environmentally-friendly production activities in accordance with the objectives of the EU.

4.4. Sofia’s agglomeration shadow

The process of change in the economic activities may be seen as a type of co-evolution, where market potential determines the localization of the economic activities and the change in the localization of these activities, on its part, outlines the map of market potential. In particular, the market potential of an industry drops sharply with increasing the distance from the city, where that industry is focused, and then it once again starts increasing after reaching a certain distance, and then it once again starts increasing after reaching a certain distance, depending on the specificities of the respective economic activity.

Since Bulgaria’s capital city is located in close proximity to the target territory (30 km away from Pernik and 70 km away from Bobov Dol (and most of that distance can be travelled on a motorway), in case of an adverse development of the current situation, Sofia and the adjacent urbanized areas will be the natural consumer of the future additional domestic migrations.

Although the capital city has its own spatial development issues and impaired living conditions, poor urban hygiene, difficult mobility, air pollution, individual marginal and poor neighbourhoods with poor physical indicators, it remains the most dynamically developing Bulgarian city, which, according to data from the NSI²¹ forms approximately 40% of Bulgaria’s GDP. This poses a significant threat to the development of the Bulgarian regions and the national economy in general.

21. <https://www.nsi.bg/tsb/2019/04/25/%D0%B1%D1%80%D1%83%D1%82%D0%B5%D0%BD-%D0%B2%D1%8A%D1%82%D1%80%D0%B5%D1%88%D0%B5%D0%BD-%D0%BF%D1%80%D0%BE%D0%B4%D1%83%D0%BA%D1%82-%D0%B7%D0%B0-%D0%BE%D0%B1%D0%BB%D0%B0%D1%81%D1%82-%D1%81%D0%BE%D1%84-4/>

Despite these conditions, this is the living place of the largest number of people, compared to the other cities and regions, since Bulgaria’s capital city focuses most of the opportunities for business, development, education and respectively, more extensive income opportunities, which at this stage proves the stronger factor than the more favourable living environment.

Thus, Sofia, ranking first among the Bulgarian cities, instead of acting as a driver for the development of its adjacent other regional and municipal centres of a lower rank, rather “sucks out” their workforce, limiting the opportunities for development of production activities and services, beneficial for these territories, depriving them from their sustainable development. Sofia “achieves” this through its poorly developed input/output road infrastructure, keeping the time for entering and leaving Sofia at approximately one hour, further obstructing daily labour migrations.

This is also the cause for the “significant interest” in maintaining high residential development density, which is widely presented to the public, as market demand for real estate, retarding infrastructural development of the input and output arteries, resulting in “retention” of the residents within Sofia’s ring road, both in terms of their choice of residential properties, and in terms of the business locations. In practice, this situation is referred to as “bottleneck infrastructure” (“bottleneck infrastructure”). This is a transport and localization problem, where time is more valuable than living conditions and if the commute time is excessive, the choice is additional densification in order to save time²². From the perspective of the utility sector, this is the less expensive option for supporting the city, but it is more hazardous, for it gives rise to a significant functional dependence from the utility companies.

*The only alternative for the reviewed towns and villages is the development of smaller-scale production facilities, which would support the businesses, focused in Sofia, i.e., the formation of the so-called manufacturing clusters, which would enable alternative employment of the people, made redundant from the sectors of coal-mining and energy generation from solid fuels. Another possible solution is focusing on manufacturing that is entirely new for the region, **and does not conform to the economies of scale principle**, which would restrict the opportunities for investments by large businesses, such as the trans-national corporations, but would provide sustainable jobs.*

4.5. Alternative locations for settlements of the same rank-size

In the second half of the 20th century the spatial organization of the economic sectors in Bulgaria was assigned a higher role than the settlements network as the main market driver for the spatial organization of the economy. This is a shadow effect from the past, where the system of central locations is developed, based on the localization of economic activities, i.e., cities have functions and rank high only if they have been localized economic activities in the system of the centrally planned economy. The territory under review is a good example in this respect, where the phasing out of the economic sector of coal mining and energy production from the extracted coal that is key to the local development, automatically exhausts the need for the

22. See Walter Isard’s Substation Principle, on page 92 below

**DEVELOPMENT
OF SMALLER
PRODUCTIONS
TO SERVE THE BUSINESSES
IN THE CAPITAL WILL
PROVIDE AN OPPORTUNITY
FOR ALTERNATIVE
EMPLOYMENT**

existence of entire towns and villages. An evidence of that is the large-scale depopulation and abandoning of residential and manufacturing infrastructure, in particular in Bobov Dol.

The target territory (the Bobov Dol and Pernik Municipalities) may be reviewed as an alternative location for economic activities, but only if the threshold level of demand for the goods or services, produced or provided therein, spatially fall within the scope of the respective company, in order to survive. If this condition is not met and the rate of return is too low, and consumers’ mobility – severely limited, companies would not be able to survive with certain localization. Therefore, before making the decision for the localization of new alternative economic activities, which might provide sustainable jobs, it is necessary to answer some questions, such as:

- **what is the path that may ensure employment?**
- **what is the market significance?**
- **what would be the traded goods (sectoral specialization – geographic factor)?**
- **what is their spatial projection?²³**

Possible answers to these questions for both reviewed municipalities are shown below:

Question	Pernik Municipality	Bobov Dol Municipality
<i>What is the path that may ensure employment?</i>	<ol style="list-style-type: none"> 1) Daily commute to the metropolis; 2) Creating alternative economic activities and conditions for employment. 	<ol style="list-style-type: none"> 1) Moving to another place, providing employment opportunities, incl. Sofia; 2) Creating alternative economic activities and conditions for employment
<i>What is the market significance?</i>	<ol style="list-style-type: none"> 1) High market significance of the export-oriented sectors; 2) Medium to low market significance of the locally oriented sectors, considering the 3rd level of the municipality according to the NCSD. 	<ol style="list-style-type: none"> 1) High market significance of the export-oriented sectors; 2) Very low market significance of the locally oriented sectors, considering the 5th level of the municipality according to the NCSD.

23. Stoychev, K., Localization approaches for regional development, Sofia, 2012

Question	Pernik Municipality	Bobov Dol Municipality
<p><i>What would be the traded goods²⁴ and what is their spatial projection?</i></p>	<p>1) Primary sector – development of intensive organic farming and organic animal production – local / national market; alternative agriculture: medicinal herbs – lavender, ginseng, goji berry, saffron, etc. – local / national / international market.</p> <p>2) Secondary sector – manufacturing of 3D printers and software for them – national / international market; manufacturing, related to sustainable mobility (scooters, electric bicycles, drones, etc.) – national / international market; manufacturing of waste disposal, utilization and recycling equipment – national / international market; manufacturing of components for RES – national / international market; manufacturing of devices and instrumentation, equipped with solar panels – national / international market; bioplastic products extrusion using waste plastics and wood – national / international market;</p> <p>3) Tertiary sector – attractions and amusement parks, incl. those, built on recultivated terrains and offering chiefly cultural and environmentally-friendly experiences, incl. industrial tourism, etc. – local / national market;</p> <p>4) Establishment of healthcare institutions, sanatoriums for the rehabilitation and extended treatment of patients with chronic disorders based on local mineral springs, etc. – national / international market.</p> <p>5) Quaternary sector – Localization of data centres for mining cryptocurrencies, using electricity, generated from RES – international market; cluster of companies for the manufacturing of RES and a University in the region – local / national market.</p>	

24. According to the model businesses, proposed in the “Just transition for the coal-mining regions in Southwest Bulgaria” Report

PART III. STRUCTURE AND CONDITION OF SOUTHWEST BULGARIA

1. THE ROLE OF THE STRATEGIC DOCUMENTS

The economic logic of the development of the regions in Bulgaria has evolved significantly through the years, but at the same time it has revealed several significant specificities. First, the conclusions, related to the regional development of a region, must differ substantially for the urbanized territories “cities/towns” and the urbanized territories “villages”, as well as for non-urbanized territories. In the current Law on the Administrative Territorial Planning of the Republic of Bulgaria (LATPRB) and by virtue of the Regional Development Act (RDA) a Municipal Development Plan (MDP) is developed for each programming period. In the programming period 2021-2027 it was updated to an Integrated Municipality Development Plan (IMDP), combining the MDP and the Integrated Urban Reconstruction and Development Plan (IURDP). The studies and the conclusions, presented in those plans aim at covering the territory of the entire analysed municipality. While doing that, however, the plan fails to take into consideration the most important internal regional difference, which has become a “disparity”²⁵, in Bulgaria, i.e., “city/town-village”. In this respect, the conclusions in these plans refer to the municipality level (LAU 1), but do not fully reveal the condition of either the cities and towns, or the villages in the very same municipality. This type of disparities is the reason for the significant differences in the quality and way of life, real estate prices, the access to services, incl. fundamental services – healthcare, education, social services, security, personality services, etc., and thus the quality, number and profitableness of the jobs. *In the Bulgarian settlements structure, life in villages is damaging to the personal development and to the opportunities for self-realization.*

This type of limitations, apart from the system “city/town-village”, also affect the opportunities for self-realization, arising from the settlement system and its internal organisation. The hierarchy of cities/towns and the municipalities of the third, second and first tier in the National Spatial Development Concept 2013-2025 (NCSD) does not meet the ESPON criteria²⁶. The hierarchy, established in Bulgaria by the NCSD is a compromise to the benefit of the administration for the allocation of EU funding.

The creation of new jobs, as well as the generation of a regional structure of urban territories with economic chains, resistant to external impact, does not easily conform to administratively imposed conditions and decisions. Therefore, the pro-

25. Regional differences become disparities when the society has no effective control thereon, but these are not the result of the public choice, while they are neither a given fact, controlled by someone else – on the contrary, they have been imposed on the society by unpromising decisions. This means that someone, with their actions or inaction, makes decisions for our lives and how we would be treated therein, and chooses to treat us in a different and usually damaging manner. (<https://doi.org/10.1377/hlthaff.27.2.374>)

26. National Spatial Development Concept, 2013-2025, page. 32

cesses of reconstruction are also very slow, and often belated, and this has reduced certain territorial structures to the presence of the bare minimum of services. This applies to most villages in the Pernik and Kyustendil Regions, as very often, these even lack a doctor, teacher and priest, public transportation has been discontinued and the remoteness prevents these villages from having access to emergency services, such as police, ambulance, fire-brigade. Often holding discussions on investments in such territorial structures may be defined as an intellectual exercise.

The second important conclusion is related to the constant dilemma whether to develop activities, which provide high added value and productivity, focused on creativity, innovations and which adapt easily to market changes, but use little workforce. The alternative is to develop activities offering medium or low added value, which are less creative, slowly adapting to the market, but use larger number of employees with low qualification. The common ground of these two processes is the system of public education, which determines the opportunities and chances for transition from one type of development to another. Both types of development largely take place at the same time and supplement each other. However, businesses, providing medium or low added value are more vulnerable. These are the cause for the low unemployment in periods of economic upswing and high unemployment rates during periods of crisis, i.e., these are the source of unsustainability on the labour market.

The main documents, which address the specialization of the economic sectors, and thus – the jobs in Bulgaria are:

- **The Bulgarian National Development Programme 2030;**
- **National Spatial Development Concept 2013-2025, as updated in 2019;**
- **Innovation strategy for smart specialization 2014-2020;**
- **The operational programmes²⁷;**
- **The strategic documents at the different territorial levels:**
 - **National Regional Development Strategy (NRDS);**
 - **Integrated territorial development strategies for tier 2 planning regions (ITDS) for the period 2021-2027;**
 - **Regional development strategies (RDS 2014-2020²⁸);**
 - **Integrated Municipalities Development Plans (IMDP);**
 - **Integrated Urban Reconstruction and Development Plans (IURDP)²⁹;**
 - **General Development Plans (GDP) of the municipalities;**
 - **Development strategies of Local Initiative Groups according to the Community-Led Local Development approaches, etc.**

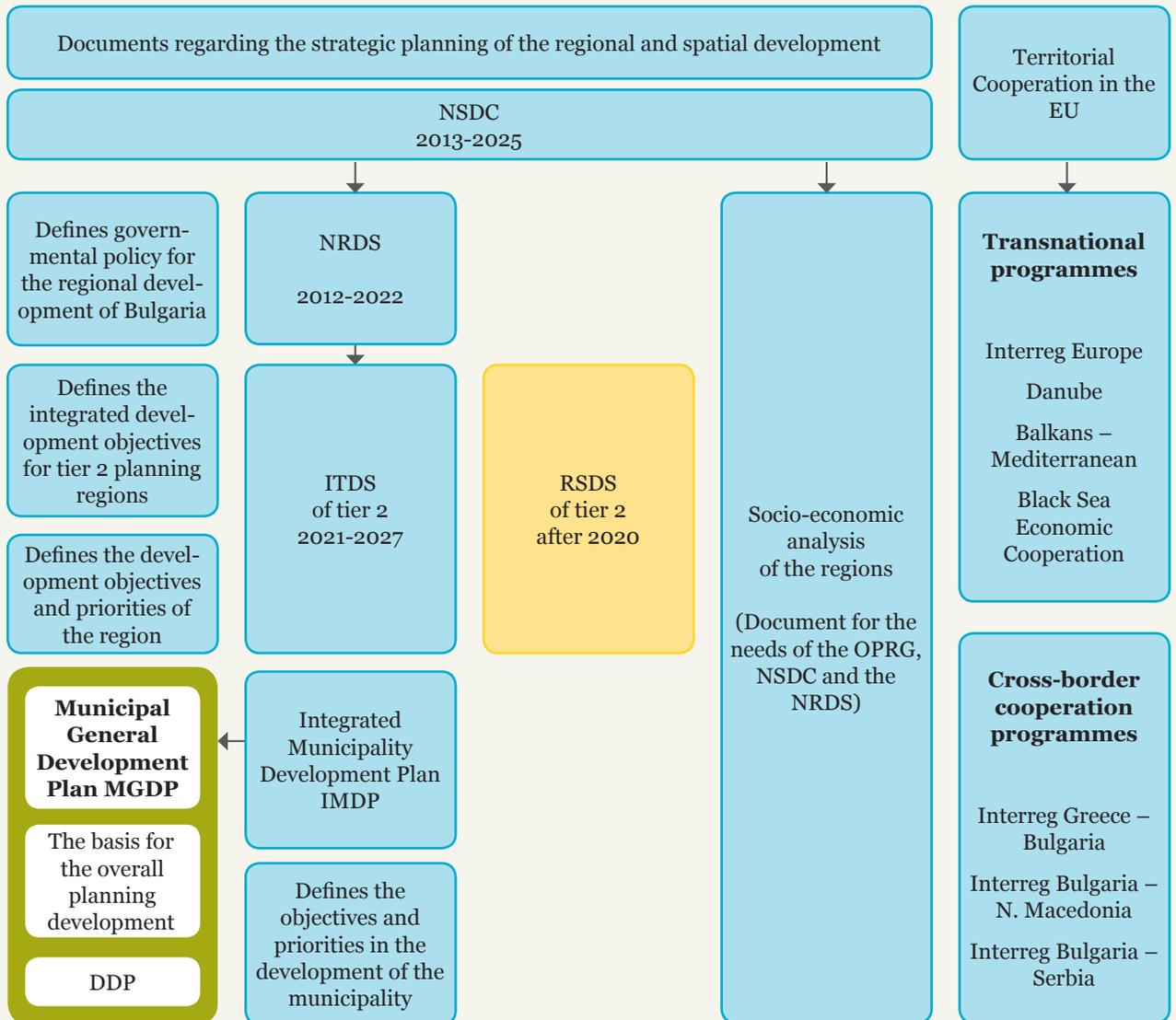
27. EU-funded operational programmes – www.eufunds.bg

28. The regional development strategies are cancelled for the period 2021-2027.

29. IURDP became part of the IMDP 2021-2027 for the first, second and third tier municipalities as per the NSDC.

Figure 2
Interrelations between the strategic planning documents, as per the RDA, spatial planning, according to the SPA and the territorial cooperation for development

All these have been developed to serve a specific targeted budgetary spending, and others (particularly those on regional and municipal level) lack financial resources, since the indicative funding is only of wishful nature.



Legend:

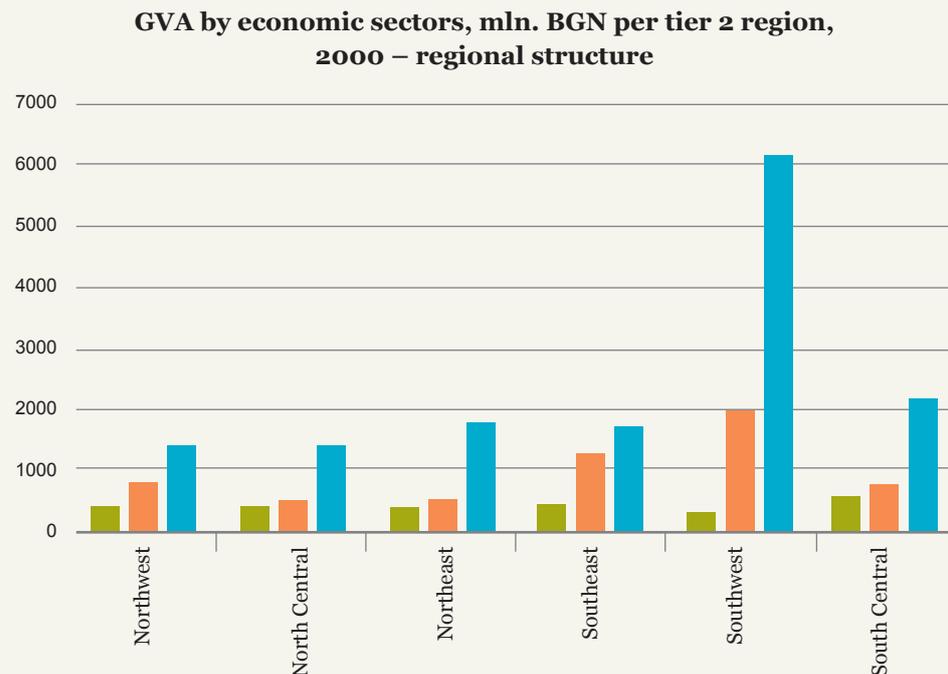
- Document, being developed under the RDA, Ministry of Regional Development and Public Works
- Document, being developed under the SDA
- Document, which has not been developed (Regional spatial development scheme for a Tier 2 region)

2. CURRENT REGIONAL AND SECTORIAL ECONOMIC STRUCTURE

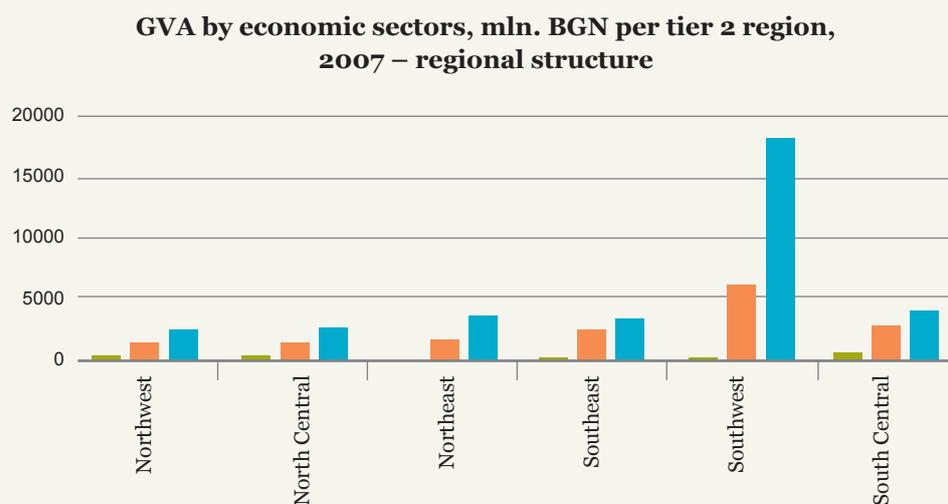
In order to determine the sectors of competitiveness, the structure of added value creation was analysed. A series of diagrams, showing the gross value added (GVA) by economic sectors at tier 2 region level and regions in the Southwest Region.³⁰

Figure 3
GVA by tier 2 regions

■ Agriculture, forestry and fishing
■ Industry
■ Services



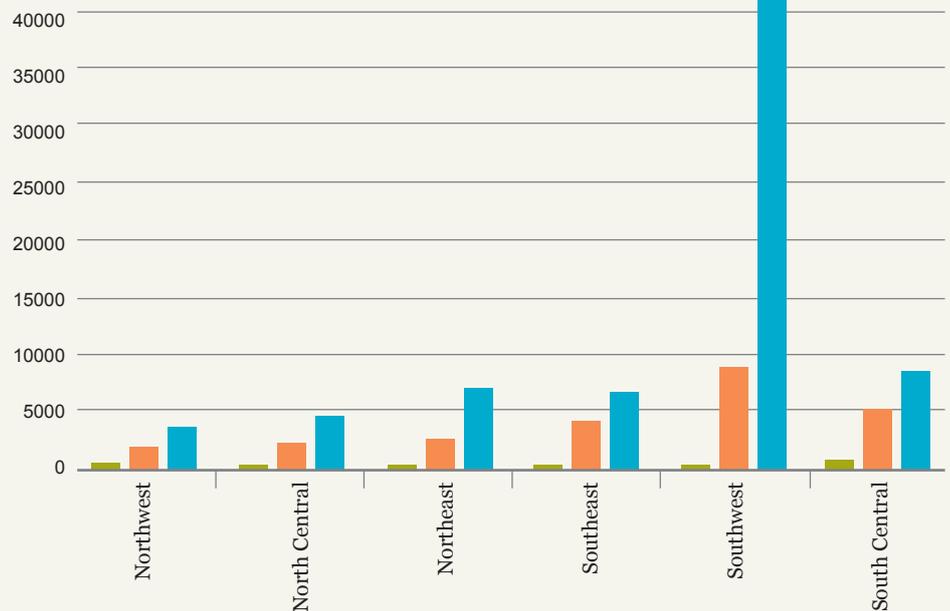
Data source: NSI



Data source: NSI

30. https://infostat.nsi.bg/infostat/pages/module.jsf?x_2=6&lang=bg

**GVA by economic sectors, mln. BGN per tier 2 region,
2019 – regional structure**



Data source: NSI

The presented data reveal the following trends:

- In 2000 the basis, from which the growth starts, was very low;
- In 2000 the disparities between tier 2 regions are already there, again with a leading role for the SWR, but to a much lower degree than what was to happen by 2020;
- IN the period 2000-2014 the industry and services sectors tripled their GVA only in the SWR. The GVA by economic sectors in all the other regions increased at incomparably lower rates, which outlines Sofia's agglomeration shadow;
- In 2019 GVA's rate of growth of the economic sectors of the industry and services was so high, that the Agriculture, Forestry and Fishing sectors "almost disappeared" in the diagram – 3.75% of the total share of the GVA on national level. Of the 265 municipalities in Bulgaria, 232 are defined as rural municipalities³¹ – having no city with population over 30 000 people on their territories. Irrespective of the planned increase of the number urban municipalities from 33 to 50³², this does not change the fact that the result is a further complicated intra-regional structure and excessive territorial distortions in GVA generation by economic sectors.

31. Ordinance No. 14 of 1 April 2003 on determining the urbanized areas in rural and mountainous regions, art. 2 para. 1 and schedule 1

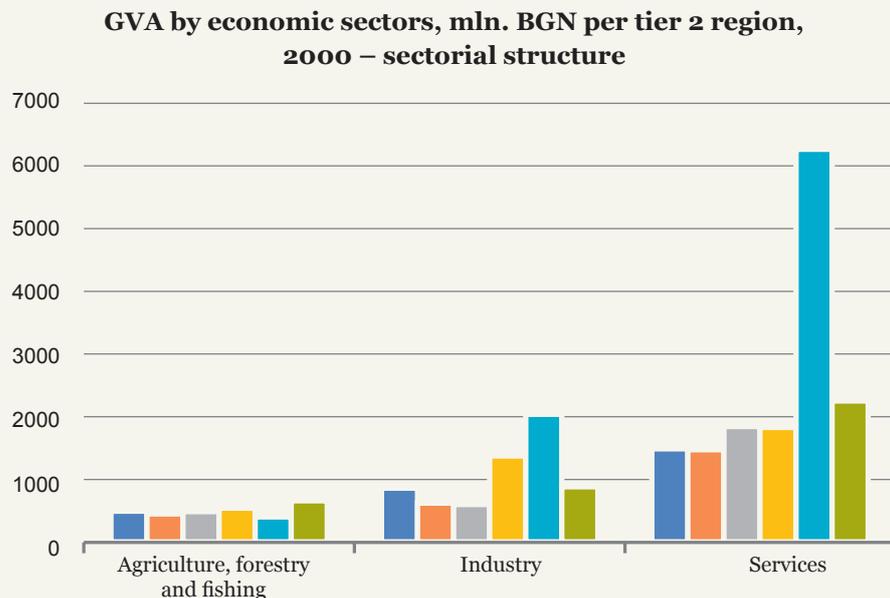
32. Currently there is a process of change in the definition of a rural (village) municipality (the population in the administrative centre is to be reduced from 30 000 to 15 000 people). After the adoption of the proposed change, the total number of urban municipalities will be 50 of the total of 265.

- In 2019 the Southwest region had such a great share in GVA generation by economic sectors, that all other 5 regions together could not reach its level in the sector services. Irrespective of the high growth of the industry sector in the South Central Region, having its centre in Plovdiv, its rate and value were almost two times lower than those in the Southwest region.
- **In the modern structure of the GVA by economic sectors, the SWR has a unique place, forming 58% of the GVA of the services sector in Bulgaria.** This, on one hand, is a factor for its accelerated development and transition to the next economic and organizational level, but on the other – it also generates certain risks, since this is mainly driven by Sofia. For example, SWR dominates the investments in education, healthcare, banking, R&D, etc., and thus it attracts the most highly qualified human capital in Bulgaria. This prevents the development of the other regions, acts as an excessive concentration factor and distorts Bulgaria’s regional development indicators.
- These conclusions show that prompt results of the investments in the sectors will be shown first by the services, followed by the industry and in the end – by the agriculture and forestry. **This conclusion gives us a good reason to define investments in services as investments in growth, in industry – investments for development, and in agriculture and forestry – as social and resource-orientated investments.**

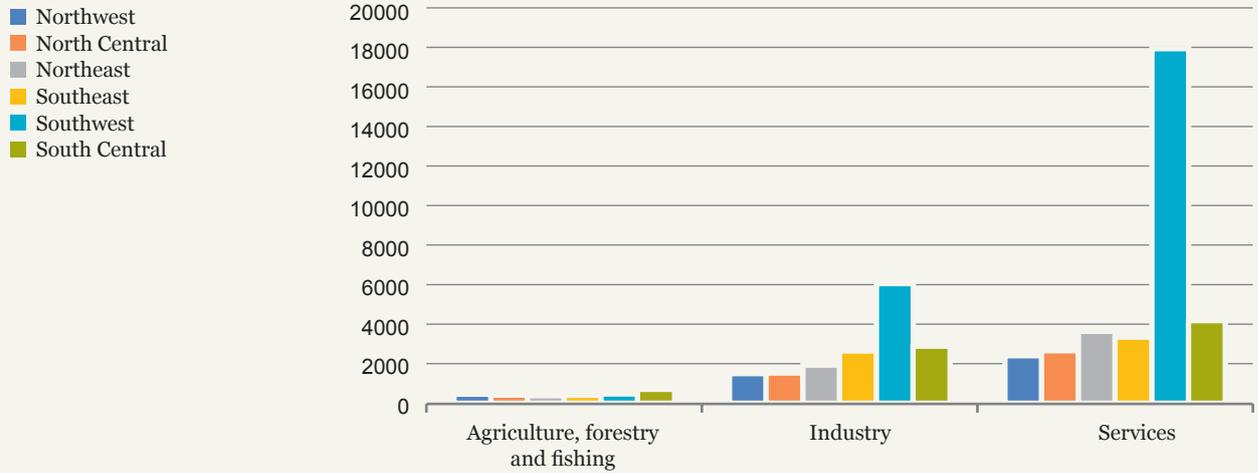
Economic structure is much different, if analysed at the administrative region level. The SWR includes the regions Sofia – City, Sofia Region, Pernik, Kyustendil and Blagoevgrad. When analysing the SWR, WWF’s report on just transition intentionally excluded Sofia-City as an administrative region, due to the aforesaid conclusions, regarding the SWR as a tier 2 region, but also due to the structure, established in the generation of the GVA by economic sectors at region level. The main conclusion that can be made is that tier 2 planning regions, although covering a significant number of administrative regions, fail to obscure the significant regional disparities, and in the period 2000 – 2019 these were even aggravated.

Figure 4
GVA by economic sectors
and tier 2 regions

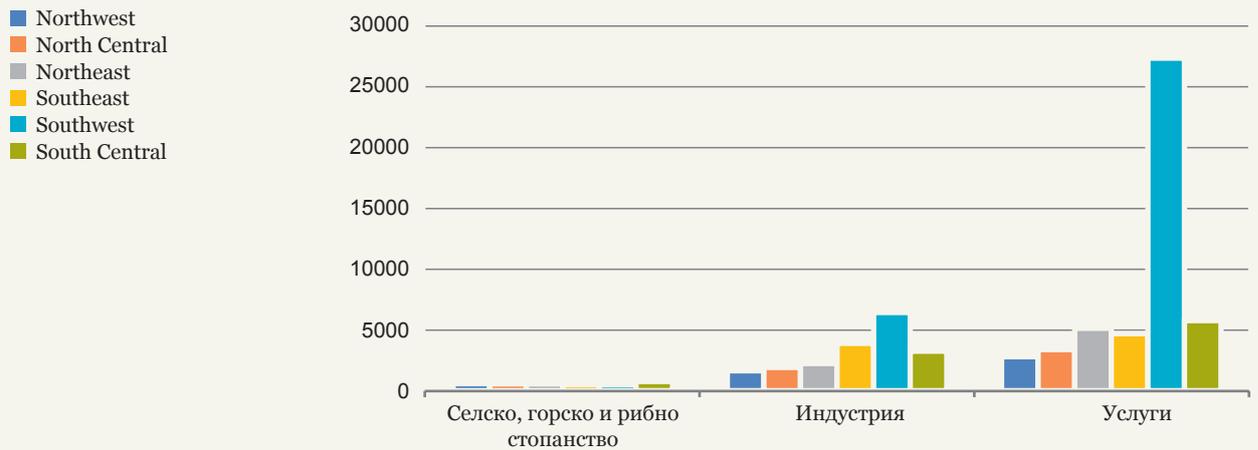
- Northwest
- North Central
- Northeast
- Southeast
- Southwest
- South Central



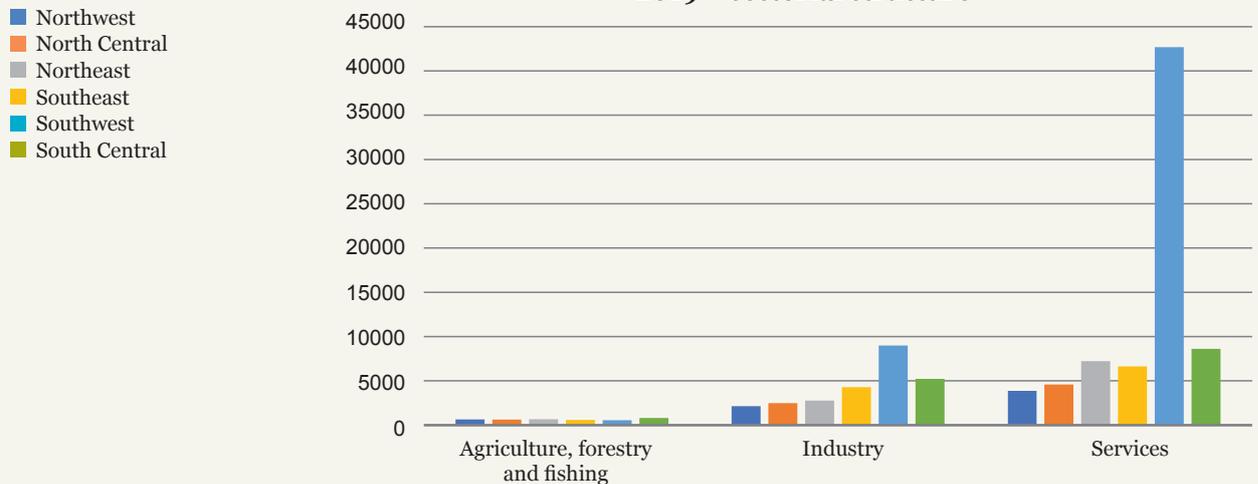
**GVA by economic sectors, mln. BGN per tier 2 region,
2007 – sectorial structure**



**GVA by economic sectors, mln. BGN per tier 2 region,
2014 – sectorial structure**



**GVA by economic sectors, mln. BGN per tier 2 region,
2019 – sectorial structure**

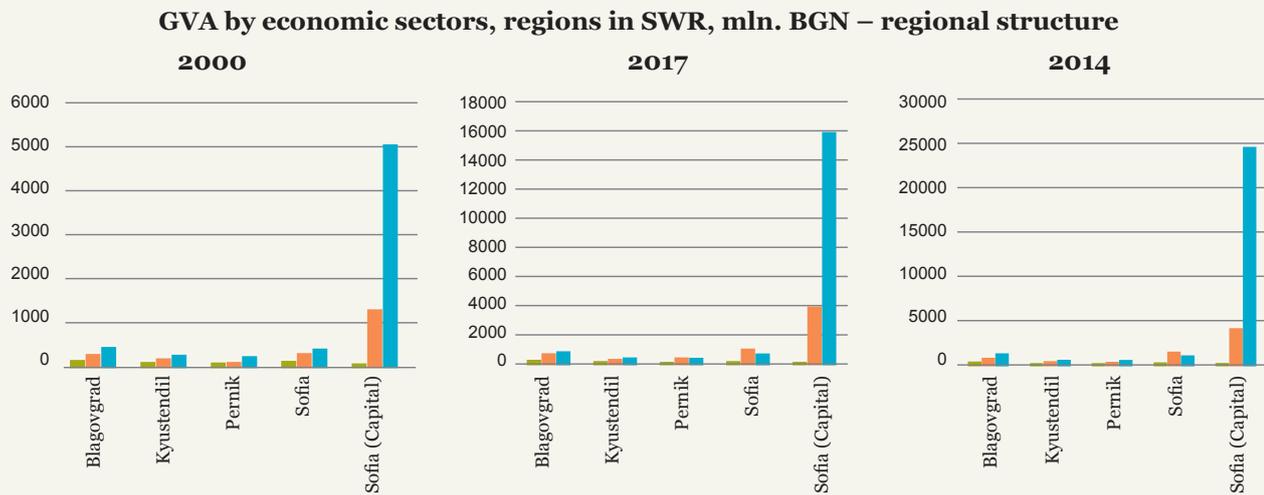


Data source: NSI

Figure 4 for the period 2000-2019 shows that as of 2000 the transition to post-industrial society had already taken place in Bulgaria. It is necessary to clarify that this did not happen in a manner, similar to that in Western European countries in the period 1965-1980, but rather as a result of the overproduction in the industrial sector and the need of “migration” of the employees to the services sector³³. In Bulgaria this was the result of the discontinuation of industrial development of socialist type, without planning, searching for and finding solutions for the employment of the redundant workers. This resulted in domestic and foreign migrations, changing the structure of employment, the structure and hierarchy of urbanized areas, the functions of the cities and towns, and thus – the development opportunities of the individual regions. This report tries to find solutions to a similar situation, where the employed in the coal-mining industry and electricity generation may remain on the free market and – lacking planning – completely chaotic consequences may be produced.

Figure 5
GVA by economic sectors in the SWR, 2000, 2017, 2014

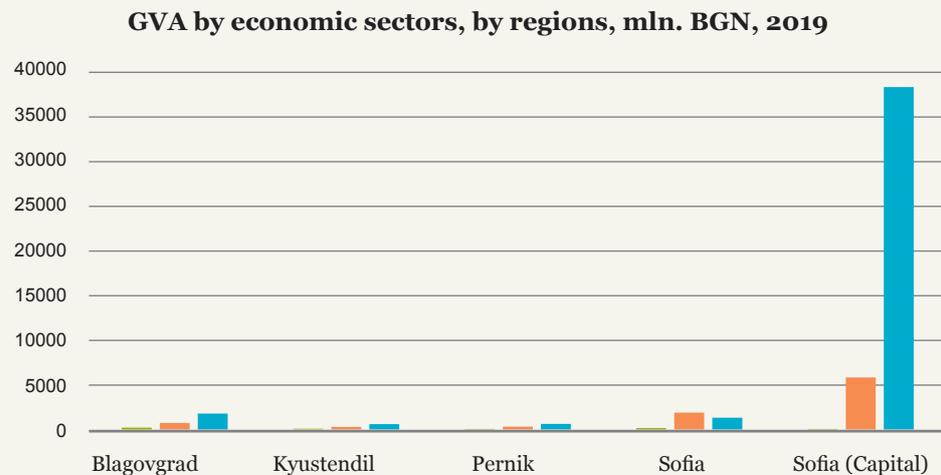
■ Agriculture, forestry and fishing
■ Industry
■ Services



Data source: NSI

Figure 6
GVA by economic sectors by regions in the SWR, 2019

■ Agriculture, forestry and fishing
■ Industry
■ Services

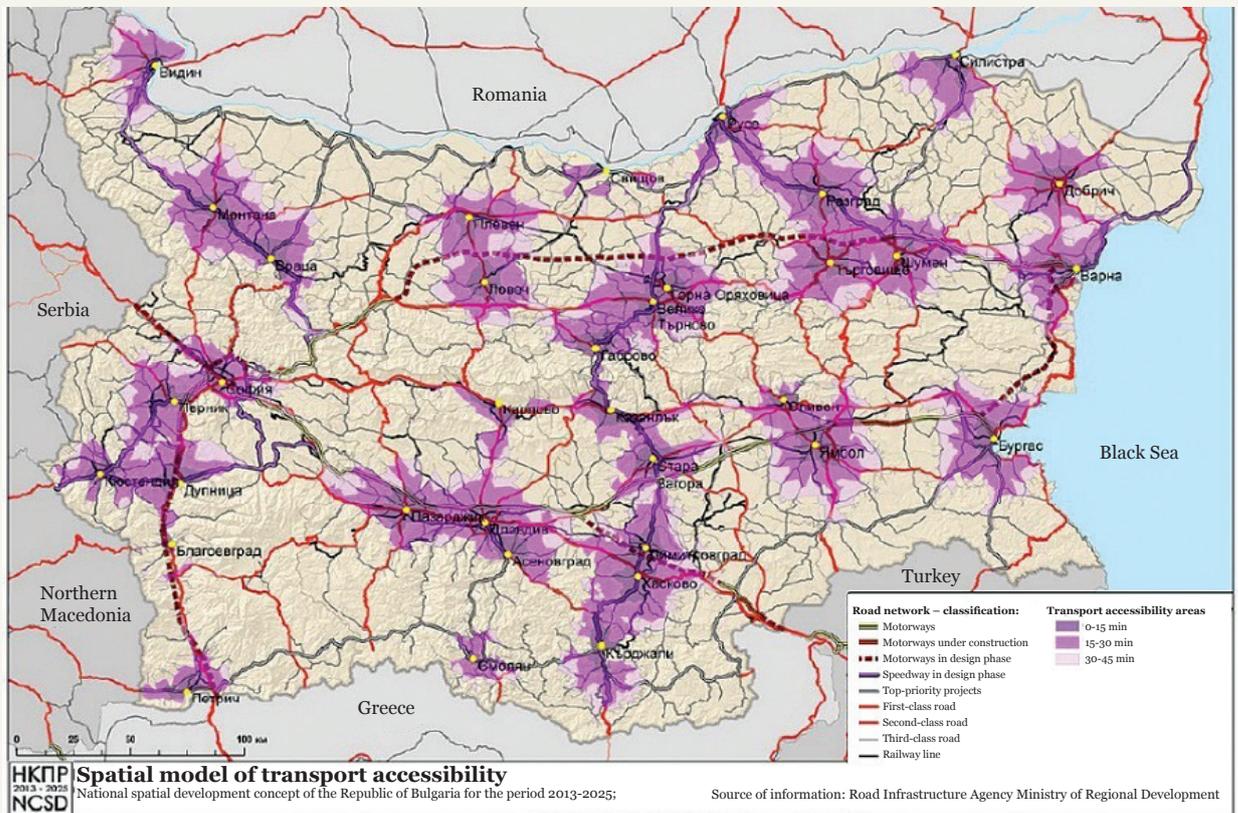


Data source: NSI

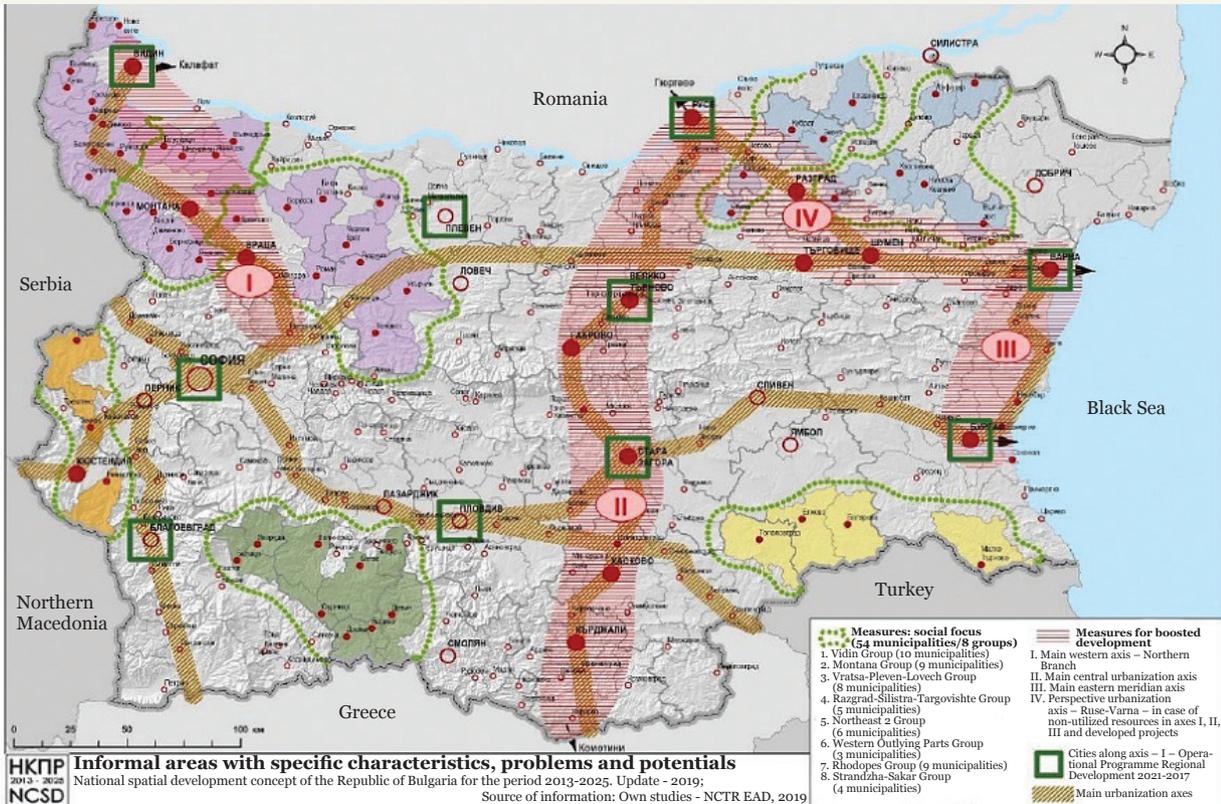
33. Post-Fordist phase of organization of the manufacturing.
Amin, Ash (1994). Post-fordism: A Reader. Blackwell Publishing. ISBN 0-631-18857-6.

The Figure shows that inside the SWR there are territorial disparities, which were already there in 2000, but neither Bulgaria's accession to the EU in 2007, nor the beginning of the new programming period in 2014 and its peak in 2019 managed to change these trends; on the contrary, the disparities have been aggravating. The leader is the Sofia-City region, which sets the trends in the SWR. All other regions are comparable to the regions in the other parts of Bulgaria, as if these are not part of the SWR.

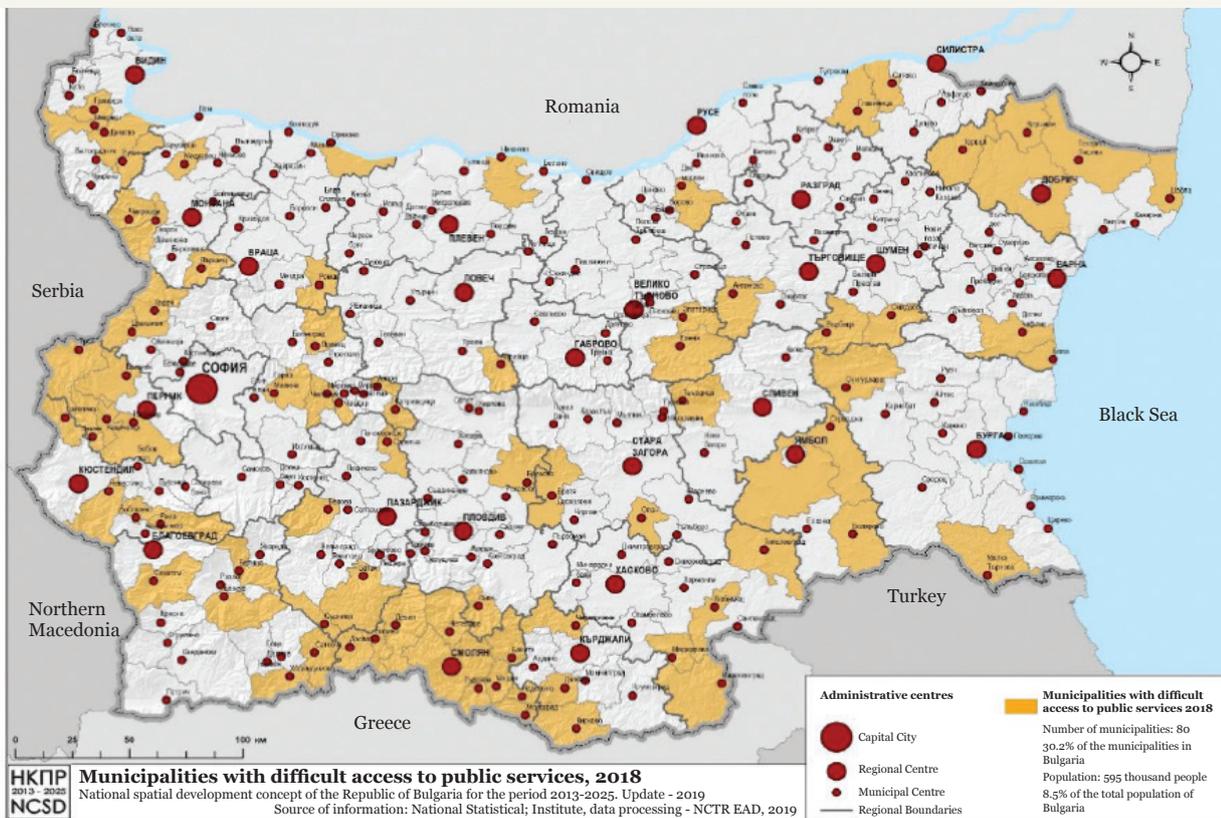
Within these differences, there is further differentiation – Sofia Region and Blagoevgrad Region are positioned in the middle, while the Pernik and Kyustendil Regions lag farthest behind. The Kyustendil Region is rather specific, which – despite being located very close to Sofia and accommodating two land borders of Bulgaria (with the Republic of Serbia and the Republic of North Macedonia), being crossed by 2 international transport corridors and having excellent transport accessibility, takes part in the formation of *areas with transport accessibility 16-30 minutes* and at the same time – *informal areas, with specific characteristic problems and potentials. In particular, area 6 “Western Outlying Parts”* and at the same time – a large number of municipalities in the Pernik and Kyustendil Regions have *difficult access to public services*.



Source: NCSД 2013-2025, page 53



Source: NCSД 2013-2025, update 2019, page 144



Source: NCSД 2013-2025, update 2019, page 98

There is a superimposition of opportunities on one hand, and on the other – of potentials and problems, which, however, are mutually exclusive. The common conclusion, which can be made is that these territories, even without the closing of TPS-Bobov Dol, and the related extractive industry, are having structural difficulties, poor economic connections with Sofia, depopulation and aging of the population.

In the further programmed development of the region, scenarios 1 and 2 from the 2019 report on just transition seem to be the most probable. *Unrealized potentials have caused the manifestation of the disadvantages of the areas of the Pernik and Kyustendil Regions, and not of their strengths.* In this respect, the number of jobs, which may be provided by a major foreign key company, at this stage remain just a hypothesis, and if this becomes true, it will contain an element of emotion or accident. This is proven by the Pernik and Kyustendil Regions. According to the NCSD, the latter find themselves in an area with good transport accessibility, there are relatively well-developed districts, but they lack the “jobs” factor. Therefore, the drivers act in the direct of daily commute towards Sofia and back, using road transport, since all forms of public transport are underdeveloped. Employment is highly demanded, but due to the decreasing number of labour resources, investors are cautious. At the same time, the jobs offered are not in line with the predominant education level in the region. Ultimately, workers with good skills are exchanged between employers in search for even higher salaries, without entry of new, trained workforce. This precludes the opportunities for specialization and the formation of a pool of specialized, learning and knowledgeable workforce in a specific sector, employers are in a position of constantly recruiting new, untrained workforce and investing in their requalification.

PART IV. NEW JOBS – THE (IM)POSSIBLE ALTERNATIVES

It is necessary to create a **scheme of growth**, to provide a completely new vision of the future. It is used to program one or two economic activities, which play the role of economic “drivers”, initially not including large structures and enterprises.

This is admissible, based on the presumption that it is impossible for all current socio-economic problems to be resolved simultaneously. It would be financially too burdening, and in fact – infeasible in practice, since the factors for development and growth, follow a solid logic, which cannot be violated. It is necessary to apply a staged approach, socio-economic objectives and tasks to be regional and locally feasible.

Regional development theories are dominated by two key approaches when providing support for development and growth:

1. **“Watering Can Principle”** – money for everyone and everything. Bulgaria’s operational programmes, funded by the EU, have operated mainly based on this principle in the two programming periods. Politically, it is considered appropriate, since it applies the solidarity principle, but it requires regions, having similar development capacities – administrative, labour, economic, technological, which is not the case in the regions in Southwest Bulgaria, as well as the rest of the country. Therefore, regions, areas and municipalities with more active political lobbies and administrative capacity redirect the flow of most of the resources towards them. Ultimately, regional differences increase and become disparities.
2. **“Concentrated support principle”** – a rational choice is made among activities, projects, sectors, which would be heavily supported, provided that these generate income with sufficient speed, and the new jobs therein will also benefit those, who have not received support.

This report is based on the provisions of the *second, concentrated support principle*³⁴, but with sufficient application of solidarity and activity, where the entrepreneurship and entrepreneurship culture are the main driving force.

The decision-making tool is composed of several localization approaches, aiming at revealing and proving which sub-sectors must receive targeted financial support and which may remain at the level of support, which they already receive from a current fund or programme.

The figure below shows the logic of the job loss and creation processes in the context

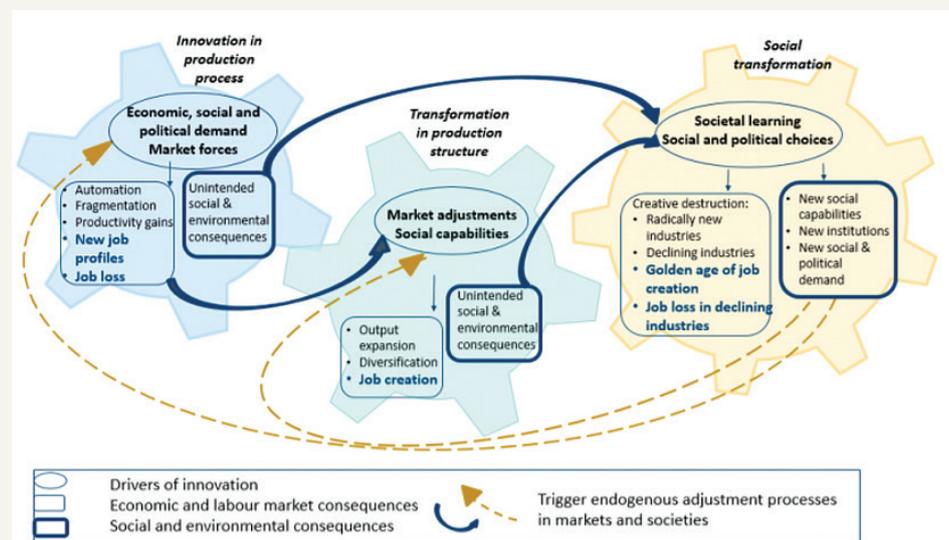
34. https://ec.europa.eu/regional_policy/en/policy/how/principles/

of technological and economic transformation. The reviewed regions are currently in phase 3 of social transformation, where the key process is societal learning, social and political choices, resulting in:

■ **“Creative destruction”**

- Radically new industries;
- Declining industries;
- Golden age of jobs creation in the new industries;
- Job loss in declining industries.

Figure 7
*Dynamics of the job loss and creation process in the context of technological and economic transformation*³⁵



“In the Figure each dimension of job loss and the process of new jobs creation (the three cogs), result in an innovation through certain forces, create various forms of innovations in the economies with certain intended and unintended consequences on the labour market, in the social and natural environment. What is most important is that these consequences trigger an internal “endogenous” process of adaptation, which creates new waves and phases of technological change and innovation. In this sense, the process, product and social innovations are part of a long period, shaping the future”. (The same source)

The Figure clearly shows that what is happening in Pernik, Kyustendil and Stara Zagora is not a global precedent, but a natural form of transformation. There are, however, several **specificities**:

■ **Impaired structures of the population and depopulation**

- most examples in scientific publications, concerning transformation are related to regions, having much more favourable structure of the population, workforce and domestic demand, especially Asia;

35. Nübler I., New technologies: A jobless future or a golden age of job creation?, Nov, 2016

- the workforce, having the necessary skills to start a new job or their own business after brief additional training or preparation, forms accounts for not more than 20% of the employees and consists mostly of people with university degrees and the longest experience. The others need to receive significant support;
- the analysed territories have impaired structures of the population and aggravating structure of the labour market.

■ **Disrupted industrial environment**

- Industrial facilities in a process of transformation have old-industrial environment, the other industrial sectors are represented only to a limited extent, the capacity is reduced to several niches;
- The manufacturing facilities in the region often have nothing in common, they do not form any local production value chains, clusters, etc.
- Local industrial formations fail to deliver at competitive prices and have not developed any form of cooperation or value chains.
- The number of companies for industrial supplies is extremely limited, mainly being merchants and strongly dependent on the market situation (product- and price-wise) in other parts of the world.

■ **Basic level of infrastructures**

- the existing engineering and transport infrastructure is at the basic level of its development.
- The infrastructures of the settlements, most severely hit by transition, suffer from serious defects. Apart from the general condition of the settlement environment, the development of the educational and health infrastructures, the emergency response services, security, is also seriously disbalanced.

All these specificities, pose special requirements to the overall process of reconstruction and development of these territories. Since the situation seem particularly dire in certain cases, both for analysing and for programming, this report relies on the localization approaches, studying the territory as a zero state for complete restart.

1. LOCALIZATION ANALYSIS – KEY ASSUMPTIONS

The demand for goods, services, social activities, etc., created by people, produce incentives for the economic system, which has an impact on its conduct, and vice-versa. A manufacturing business embodies its potential market clients, the competitors, suppliers, the regulatory framework, the labour market, etc. The concept of interaction of the system/business with its environment is of particular significance, when attempting to understand its conduct, development options and its survival in the form we know. In other words, the regional economic system needs supplies and investments, which it receives from the external environment in the form of industrial orders from other companies. The end product – “finished product” – is the main way of interaction of the company with the external environment in reverse order –

where it establishes its place on the market and its capabilities to reinvest its income. In the Pernik and Kyustendil Regions this interconnection is severely damaged or only exists in a very limited number of sectors. Therefore, these are “invisible” for investments from localization perspective.

This type of open manufacturing systems has a cyclic style of development. Generally, apart from the manufacturing systems, such a cyclic development may also be observed by territorial open systems of the core (city) – periphery (hinterland³⁶). type. In order to exist, a city needs the goods, produced by the non-mobile manufacturing factors of the periphery, as explained by Paul Krugman³⁷. In the case of Pernik and Kyustendil, the peripheries of both towns in fact lend their growth factors to Sofia, and not to the local centres. This has continued for rather a long time and a part of their potentials have been transferred to the metropolis, while others have never developed.

Table 1
Forces, affecting geographic concentration (according to Krugman)³⁸

Centripetal (attracting)	Centrifugal (detering)
<ul style="list-style-type: none"> ■ Effect of the market size (connections with other local businesses) ■ Abundant labour market ■ Net additional benefits 	<ul style="list-style-type: none"> ■ Non-mobile factors (employees in the agriculture and animal production sectors) ■ Ground rent (the difference of income from different land) ■ Net additional costs

Periphery provides agricultural and animal products, mineral and energy resources, etc. Periphery, then, is market, technologically and transport-dependent from the core. This analysis covers three main locations:

- Within the regional centres,
- Within the municipal centres, and
- Outside of them.

This report focuses on the selection of localization models, manipulating and programming the manufacturing factors in the economic system of Kyustendil and Pernik to the state and behaviour of a market economic system. Since their economic system is an open system, developing cyclically, lacking a clear and precise start, this leads to the main question:

Where to start with the localization analysis?

36. <https://bg.wikipedia.org/wiki/%D0%A5%D0%B8%D0%BD%D1%82%D0%B5%D1%80%D0%BB%D0%B0%D0%BD%D0%B4>

37. https://bg.wikipedia.org/wiki/%D0%9F%D0%BE%D0%BB_%D0%9A%D1%80%D1%83%D0%B3%D0%BC%D0%B0%D0%BD

38. Krugman, P. (1998). What's new about the new economic geography? Oxford Review of Economic Policy, 14, 2.

In order to answer this question, let's imagine a company that makes a decision to launch a business, manufacturing a certain product on the territory of the Pernik or Kyustendil regions. In this way we are setting the first condition for a market entrepreneurship initiative.

The very decision for such establishment produces a long chain of market demand. The company would buy land, where the manufacturing facilities would be constructed, it would purchase equipment, machinery, materials, supplies, it would recruit workforce, etc. In response to the new demand, a market order for other companies in the economic system of the two regions will emerge, which will see that as an increase in their sales, since this would be the result from a counterparty, just appearing on the market, and who did not exist previously.

In its turn, each existing company will then pay its counterparts for the used goods and services, i.e., this will produce a cumulative effect. And vice-versa, if the business is in recession and closing of companies is anticipated, as is the case with the coal-mining industry, such manufacturer's leaving the market will have a negative impact on the same number of companies, and they will see a drop in their sales and in their turn, decrease their orders placed with other companies. Therefore, in order for a manufacturer or supplier to survive, to successfully do business, it shall have to compete with other companies, manufacturers of the same goods or substitute products of that manufacturer's product. Such competition capability should ensure a sufficient market share. The manufacturing of the goods with the required quality and price itself, does not necessarily guarantee success. In order to maintain their *competitive advantage*³⁹, manufacturers must make rational and appropriate choices, regarding strategically appropriate localization (positioning) of the enterprise/company.

Making a rational localization decision is the key. Today's world is governed by three groups of technologies:

- **Information technologies** – information technologies and software – manufacturing of computers, microprocessors, semi-conductors and other components, related to hardware and the information technologies. Currently this is the value chain with the highest added value in human history⁴⁰. Thanks to these technologies now we have portable computers, smartphones and all the countless other electronic products and devices at affordable prices.
- **Design intensive products** – all types of old-industry products (clothing, footwear, consumer goods, foods, but conforming to the current fashion, design and certain style).
- **Business services** – specialized consulting services, bank and educational services, agency, etc., requiring special experience and skills, establishing a lobby environment, public attitudes or policy.

Therefore, the process of growth, development and prosperity does not only take place in time and in an individual business, but rather it is a distinctive feature of the various territorial systems, which we refer to as regions. This process has a self-am-

39. Porter, M. E., (2004) *The Competitive Advantage of Nations*, Sofia

40. Sectors of similar economic significance and added value in the near future may be, for example – nanotechnologies, renewable energy sources and robotics.

plifying, cumulative and inertia effect, which is in fact the cause for the main problem of regional development itself, as policy and as objective. **Therefore, focused support for Kyustendil and Pernik through the Just Transition Fund aims at a new redistribution of the manufacturing factors in space, which will provide them with a new position in the system of Bulgaria's regional economy. The only way for this to happen in a just manner, is to follow a project-based principle, implementing first the projects, preserving the advantages of the region and transforming its economy towards activities with sufficient jobs and higher added value than the current one. This objective is fulfilled through a mix of energy efficiency projects, renewable energy, for economic growth, based on the local factors and conditions, accelerated technological modernization, etc.**

In this complex state of the economic system of both regions, developing in a cyclic manner (30 years ago coal-mining used to be their advantage, and now it is their weakness), there is no “natural beginning” or “Natural end” in its programming.

Therefore, the retrospective analysis, i.e., identifying and analysing the localization factors and conditions for the manufacturing, from historical perspective, would be inadequate to the specific needs of both regions.

The localization models, selected for application to the Kyustendil and Pernik Regions, are part of those, the conclusions of which are valid in the conditions of a simplified economic environment. We answer the question, how the economic activities would be situated in hypothetical conditions, with view of the environment. Since it has already been proven that the population is with impaired structure and distribution, and the industrial environment – basic, it can be assumed that these localization models will provide a good basis for discussing how and where to create new jobs.

When analysing the spatial characteristics of the economic system, we will first focus on the effects of only one major variable. The objective is to simplify the actual economic system, thus investigating in depth the effects of the **factor “distance”**. This would only be possible through limiting the effects of the other factors in the economic system and assuming that the other factors have no impact on the spatial characteristics or that at present these are of **constant nature**. This presumption applies to all the main groups of factors – economic, social, cultural, psychological, etc.

This assumption will relieve us of the stereotypes that have been accumulating through time, regarding the distance from Sofia and the geographic location of the two municipalities. They have been traditionally considered very favourable, beneficial, productive, etc., but the socio-economic indicators show an entirely different situation.

We make assumptions for the spatial characteristics of two of the key factors for development: **the geographic surface and the population** as the manufacturer and consumer of products in both reviewed regions – the Pernik and Bobov Dol municipalities.

Table 2
Criteria for the localization conditions

First group of assumptions, regarding the geographic surface:	Second group of assumptions, regarding the population:
<p>1. The surface area is infinite and homogenous in all respects:</p> <ul style="list-style-type: none"> ■ The surface area is completely flat, without any limitations of movement in all directions; ■ Transport costs are proportional to the distances and there is a single transport system; ■ Natural resources are equally distributed, e.g., soils are equally generous, etc. 	<p>2. The population has the following characteristics:</p> <ul style="list-style-type: none"> ■ Uniform spatial distribution; ■ Equal revenues, demands for goods and consumption inclination; ■ Both manufacturers, and consumers have complete knowledge of the environment and act entirely rationally in accordance with this knowledge. Therefore, they are capable to have optimal position.

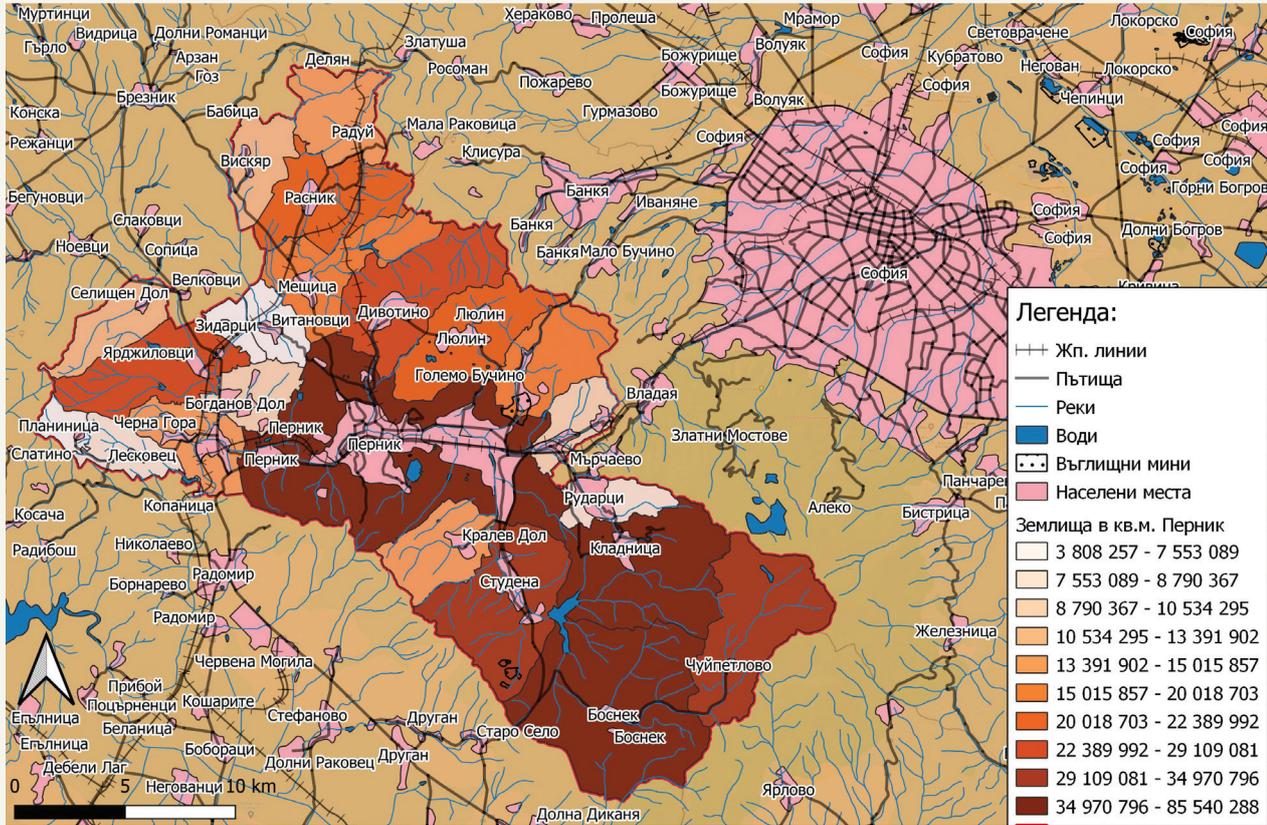
Considering the conditions above, the only factor, which will have an active effect on the spatial form of the economic system, are the costs, incurred in the covering the respective distance.

Article 2(2) of the Bulgarian Regional Development Act stipulates the following: “2) (formerly the wording of Article 2 – State Gazette No. 82 of 2012, effective as of 26.11.2012) Governmental regional development policy shall establish conditions for the balanced and sustainable integrated development of the regions and the municipalities and covers a system of regulatorily established documents, resources and actions of the competent authorities, focused on: reduction of the inter-regional and intra-regional differences in the level of economic, social and territorial development”⁴¹.

It should be noted that territorial differentiation (regional disparities) is a key internal feature, natural condition of the economic space. In fact, it functions, thanks to these disparities and should not be subjected to reduction. Therefore, the objective of the legal provision may be not to reduce inter-regional disparities in any respect, but to try to establish regional subsidiarity and efficiency. This means that every region and municipality should benefit from what it has available and setting it apart from the other regions and municipalities.

41. Regional Development Act, amended and supplemented in SG No. 21 of 13 March 2020.

Figure 9
Geographic situation of the Pernik Municipality



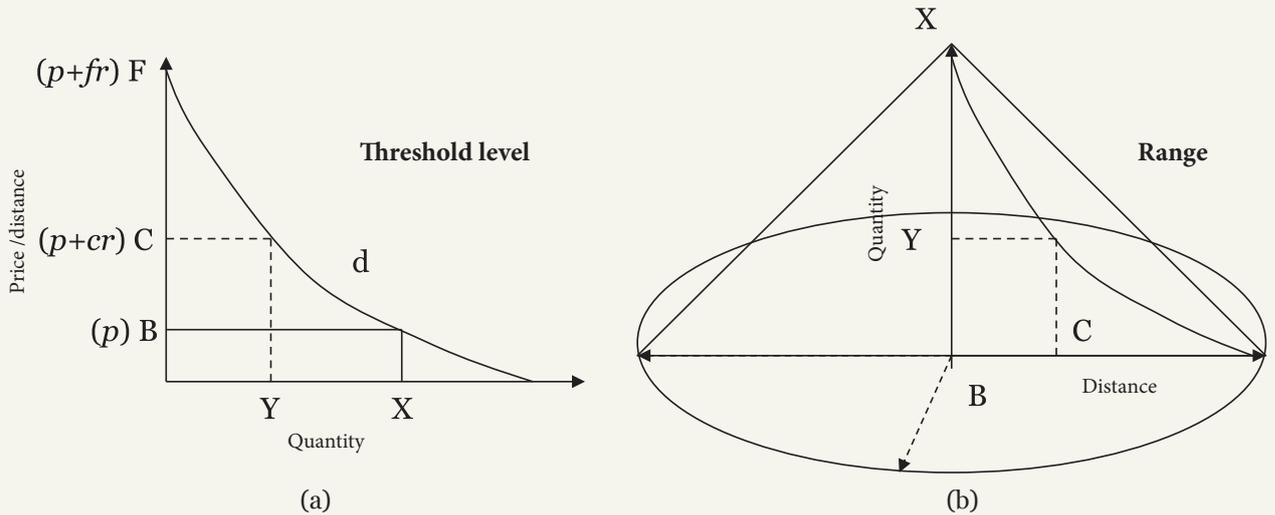
Source: Regioplan GIS analysis

The quantity that each customer would buy, depends on the requested market price. all other conditions being equal. Therefore, the farther the buyer is located, the less he shall consume – a situation, taking place according to the *iceberg transport costs model*⁴³. Generally speaking, the longer the distance from the point of manufacture, the higher the price and the lower the quantity would be bought by the buyers that are located more remotely.

43. Iceberg transport costs – this is a theoretical framework, where the transportation costs for a commodity x are presented as part of the commodity itself x' . The concept is detailed by Paul Krugman in his work in the area of "New Economic Geography", a winner of the Nobel prize in economics in 2008. The name originates from the example of an iceberg moving from north to south. The farther the iceberg gets, the more it "melts", until it is fully melted. For example, if we are transporting a product from Kjustendil to Sofia, the worth of the product being BGN 1000, and the transport costs amount to BGN 200, according to the iceberg transport cost model, in Sofia the product would be worth BGN 800. Therefore, every 100 km that product "loses" BGN 200 of its worth. If the same product travels 500 km, it would not be worth anything in these conditions. In real-life economy, the new price of the product would be its original worth plus all the transport tariffs, related to its delivery. Thus, in Sofia the price of this product would be 1000+200 to cover transportation cost.

Figure 10(a) Hypothetical demand curve for a good (d).

(b) Hypothetical demand cone for the same good. (per Dunn, 1954)



The Figure shows the interrelation between the distance, at which the consumers should be located and the quantity of goods, they would be able to buy. *This analysis only applies if it is assumed that consumers would travel themselves to the point of manufacture.* The same rule would apply also if the manufacturer transport himself his goods to the consumers, applying uniform f.o.b. (free-on-board) pricing policy for industrial enterprises. The main idea is that the consumer is burdened with the transport costs, whether directly or indirectly. This increases the end-price of the goods in direct proportion to the increase in the distance.

The analysis explains the state of the farthest settlements in the Pernik and Bobov Dol municipalities, as well as the municipalities in the Pernik and Kyustendil Regions, situated near country borders. Since the goods and services offered there, are at near the threshold level, consumers have no incentives to travel to these locations and be burdened with additional costs. Therefore, when proposing projects for these remote settlements, benefit, which is not market, but emotional or of some other type, should be offered – clean environment, healthiness, intangible heritage, etc.

Since population in our model is uniform, the distribution and movements in all directions are not limited, we could visualize demand for such goods, as a demand cone, described around the triangle BXF (see figure 10 b). In this way, spatial variation is expressed by the conical surface, with the highest value being at the top, coinciding with the point of manufacture – B and gradually decreasing to the end perimeter of p. F. The circle, forming the cone base, is the range of the good. It outlines the maximum space, where the goods, manufactured at B can be sold. The reason for this is that it makes it possible to serve a maximum number of customers at the cost of minimum total expenditures. This also makes it possible to predict the threshold demand level in a spatial context, i.e., how big the circle for this business will have to be for it to be launched and to persist. There must be sufficient demand within that circle, so that the goods are marketable and allowing a certain profit. *Therefore, in order for the goods to be manufactured and for such manufacturing to continue, the range of such goods must significantly exceed their threshold level.* This would ensure significant gains,

resulting from the revenues and covering all the expenditures, uncured from the point of the threshold level. This means that the bigger the difference between the range and threshold level, the higher the profits from such goods would be.

In practice, it is impossible that the entire population, although and uniformly distributed, is served by only one manufacturer. In the situation with the Pernik and Bobov Dol municipalities, however, very often the villages are served by a sole facility (supplier/manufacturer), lacking any clear specialization of such stores/facilities/service providers, because it is unclear for which goods/services, what the threshold level is, due to those villages scares population.

If a second manufacturer of the same goods/services appear on the regional market, his existence shall be based on the fact that there would be unserved consumers there, situated outside the first manufacturer's range.

The same manufacturing conditions apply to such a second manufacturer and the number of potential consumers substantial exceeds the minimum threshold level of the goods. The price of the goods at the point of manufacture and the transportation costs are the same as those of the first manufacturer and the goods' threshold level and range would be absolutely identical.

Since the first manufacturer is already localized, the second manufacturer, as well as every subsequent one, would be relatively limited in their choice of location. The second manufacturer cannot be located at a distance, less than twice the radius of the market area of the first manufacturer. Otherwise, the two market areas would overlap, which would cause competition between the manufacturers and thus a decrease in the sale of one of them or of both.

In the cases, when the demand for the goods remains unsatisfied, i.e., the settlement is bigger, a third, fourth, fifth and Nth manufacturer of such goods appear, based on the aforesaid principles. All of them would serve market areas in the form of a circles with identical radii.

In this situation, the price depends entirely on the distance travelled from the point of manufacture, and in order to achieve satisfactory results, manufacturers share the overlapping market area. In this way, only consumers, situated along the separation line, will be able to buy from two manufacturers at the same price. Therefore, the above line is also known as the *indifference curve*.

For our localization analysis it is important to identify the indifference curve in several aspects:

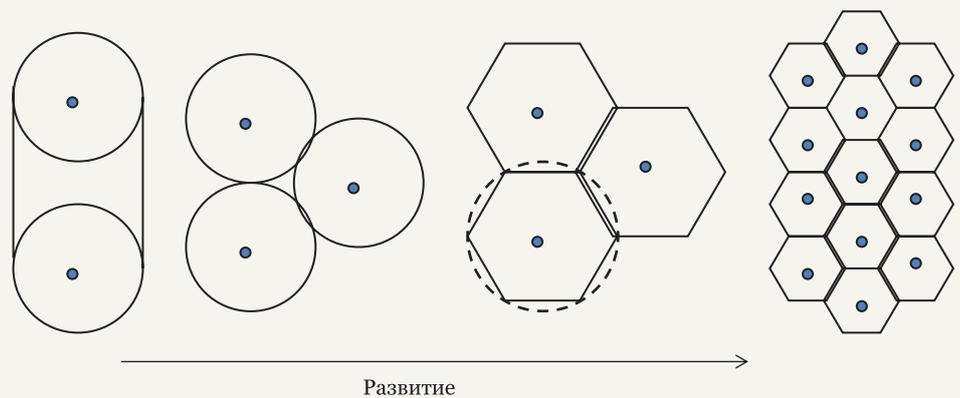
1. Indifference curve between the villages in the two municipalities and their municipal centres – Bobov Dol and Pernik;
2. Bobov Dol vs Kyustendil, Dupnitsa (secondary core in the Kyustendil Region) and Sofia;
3. Pernik vs Sofia.

This cannot be done on equal footing, but should rather be based on specific sectors and businesses. This means that the range and the indifference curve between these central places is situated at a different location for the individual businesses. If we manage to find out which businesses have a wider range in favour of the Pernik and Bobov Dol municipalities, we would be able to predict in which sectors and businesses

it would be reasonable to invest, and in which Sofia and the other centres in the SWR of Bulgaria are more advantaged.

Since market cannot stand empty spaces, it should be extended to the point, where it is fully saturated – balance state. This condition must be satisfied from both manufacturers' perspective, and from customers' perspective. A long-term solution can only be achieved at a moment, where any further change in the market surface area would result in a manufacturer having a number of customers, below the minimum level, required for his survival.

Figure 11
Saturating the market by
a single manufacturer to
market areas shaped as
regular hexagons
(A. Leusch, 1962)



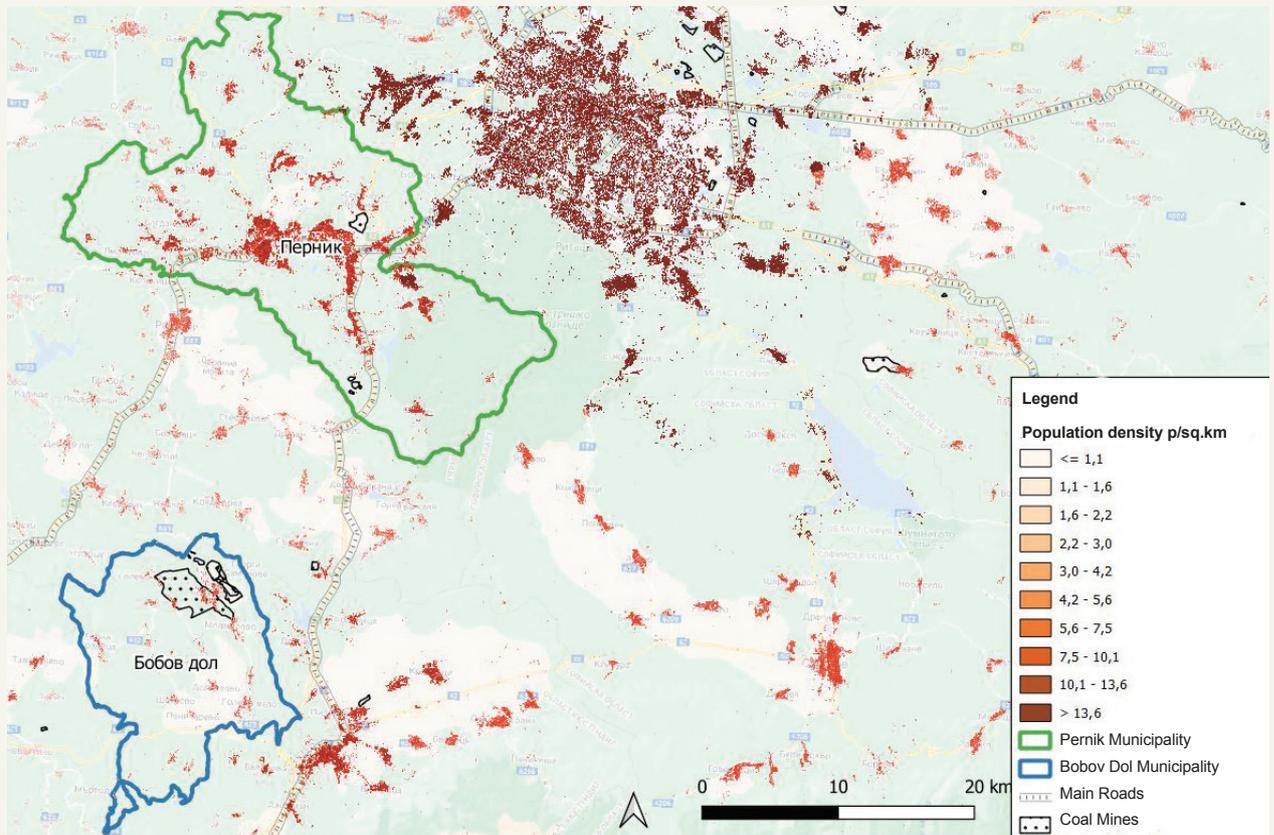
This moment has occurred long ago in some settlements in the Pernik and Bobov Dol municipalities, as well as in the Pernik and Bobov Dol cities themselves, with respect to businesses, developing in Sofia and Kyustendil. This was caused not by the occurrence of over-supply and productivity conditions, but rather due to negative demographic processes. Depopulation has consumed the consumers, the range has become too large, and the threshold level – too high and that is the reason for the lack of the necessary conditions for the emergence of any investment intentions whatsoever. Then, even Sofia and Kyustendil do not offer the respective goods to Pernik and Bobov Dol at a reasonable market price, there are no conditions for development of the same business in their locations. This results in high levels of supply and impaired industrial environment, as specified above. In fact, all villages with population below 200 people are in a state of a lack of minimum demand threshold and there is no market demand for investments, related to the respective settlement. The only market investment initiative there is based on the environmental conditions and natural resources in the areas of the settlements – arable lands, pastures, mineral resources, water bodies, forests, etc. Every project that is implemented in this group of settlements is the result of financial grants, irrespective of origin of financing – construction and repairs of the village infrastructure, construction and repairs of buildings, investments in accommodation (e.g., measures 311 and 312 under the Rural Development Programme /RDP/ 2007-2013 and 6.4 under RDP 2014-2020), investments in processing companies (the same source), etc. The second group of measures have no minimum threshold level of demand in the settlement and therefore they can only be implemented through Financial Grants.

Table 3
Population by settlements, 2011

City/town/village	Population as of 01.02.2011	City/town/village	Population as of 01.02.2011
BOBOV DOL Municipality⁴⁴	9067	PERNIK Municipality	97181
BOBOV DOL	5737	BRATANOVTSI	2263
BABINO VILLAGE	229	PERNIK	80191
BABINSKA REKA VILLAGE	97	BOGDANOV DOL VILLAGE	486
BLATO VILLAGE	30	BOSNEK VILLAGE	155
GOLEMA FUCHA VILLAGE	118	VISKYAR VILLAGE	102
GOLEMO SELO VILLAGE	488	VITANOVTSI VILLAGE	269
GOLYAM VARBOVNIK VILLAGE	175	GOLEMO BUCHINO VILLAGE	726
GORNA KOZNITSA VILLAGE	144	DIVOTINO VILLAGE	1911
DOLISTOVO VILLAGE	280	DRAGICHEVO VILLAGE	2121
KORKINA VILLAGE	175	ZIDARTSI VILLAGE	80
LOKVATA VILLAGE	8	KLADNITSA VILLAGE	1202
MALA FUCHA VILLAGE	145	KRALEV DOL VILLAGE	619
MALI VARBOVNIK VILLAGE	108	LESKOVETS VILLAGE	117
MALO SELO VILLAGE	328	LYULIN VILLAGE	849
MLAMOLOVO VILLAGE	742	MESHTITSA VILLAGE	873
NOVOSELYANE VILLAGE	75	PLANINITSA VILLAGE	30
PANICHAREVO VILLAGE	71	RADUY VILLAGE	51
SHATROVO VILLAGE	117	RASNIK VILLAGE	399
		RUDARTSI VILLAGE	1362
		SELISHTEN DOL VILLAGE	146
		STUDENA VILLAGE	1819
		CHERNA GORA VILLAGE	302
		CHUYPETLYOVO VILLAGE	29
		YARDZHILOVTSI VILLAGE	1079

44. t.ly/TfMk

Figure 12
Population distribution and density, 2019



Source: Regioplan GIS analysis

The use of data from the last census 01.02.2011 aims at showing the complexity of the processes, even 10 years ago. From demographic perspective, the data today cause even bigger concern. As seen from the GIS visualization with data from 2019 with the gradient used, Bobov Dol Municipality is hardly visible. The objective of the report is not to draw an apocalyptic picture, but to provide the solid logic for the introduction of targeted regional policy, related, but not limited to forthcoming utilization of funding from the Just Transition Mechanism for coal-mining regions. Therefore, the precise level of aggravation of the demographic development indicators, is of no great significance for the future solution proposals.

3. DETERMINING THE MINIMUM THRESHOLD LEVEL OF THE KEY BUSINESSES AND SERVICES BY SETTLEMENTS IN THE PERNIK AND BOBOV DOL MUNICIPALITIES

The minimum threshold level and range of the key businesses and services by settlements in the Pernik and Bobov Dol municipalities were determined, based on the following conditions. The used number of the population was that as of 01.02.2011 since this was the latest official census. It should be understood, that based on this model, every entrepreneur can determine their own threshold level for their specific business.

The selected businesses are in the following sectors:

- **Agriculture, Forestry and Fishing (sector A)**
 1. This sector is not localized within settlements and is state-subsidized, therefore it was excluded from the calculations.
- **Industry (sectors B, C, D and E)**
 1. Manufacturing of food/beverage products
 2. Manufacturing of clothing/footwear
 3. Enterprises in the heavy industry and energy sectors
- **Civil engineering (sector F)**
 1. Construction company for interior repairs
 2. Construction company for construction projects up to 4th category
 3. Construction company for construction projects from 3rd to 1st category
- **Wholesale and retail trade; repair of motor vehicles and motorcycles (sector G)**
 1. Grocery stores
 2. Clothing and/or footwear shops
 3. Household products and hardware shops
- **Transporting, Storage and Posts (sector H)**
 1. Courier company branch/office
 1. Courier company hub
 2. Independent transport company
- **Accommodation and food service activities (sector I)**
 1. Hotel
 2. Restaurant
 3. Café
- **Other (sectors J, L, M, N, P, Q, R and S)**
 1. Bank branch office
 2. Pharmacy
 3. Healthcare centre/hospital

Important: The model excludes governmental structures and institutions, established by law – defence, judicial system, police, fire brigades, ambulances, etc.

According to data from the NSI, the 2011 census shows that the average number of members in a household in Bulgaria is 2,4 people⁴⁵.

All calculations were made, according to the following formula:

$$(1) \quad x = \frac{(P \times Y\%)}{Z}$$

Where:

x – the number of theoretically possible facilities of the respective business;

P – the number of the population;

$Y\%$ – the average workload of the respective business in ‰, for hospitals it will be determined based on the morbidity rate, for the grocery store, hotel, restaurant it is the number of visits per month for purchases, compared to all urban travels, etc.; every entrepreneur may set their own criteria, which would then be measured in per milles and establish their own threshold level, accordingly.

Z – average annual capacity of the respective business⁴⁶.

Using the threshold level and range rule, the following results are obtained:

45. t.ly/yqBG

46. For example – for a restaurant with 30 seats, operating without a day-off, the maximum would be 10950 customers, if each seat is taken on a daily basis by at least one customer, but the average annual capacity (the actual load is 40% of this value) would be 4380 people.

Table 4
Threshold level and range of selected businesses in the Pernik and Bobov Dol municipalities

	Minimum threshold level of households	Number of people, based on the No. of households	Average annual capacity	Unit of Measurement	Work-load	Pernik	Bobov Dol
Agriculture, Forestry and Fishing (sector A)							
<i>This sector is not localized within settlements and is state-subsidized, therefore it was excluded from the calculations.⁴⁷</i>	0	0	0	0	0	0	0
Industry (sectors B, C, D and E)							
1. Production of basic food (bread)	500	1200,00	365000	pcs	304,17	80,99	7,56
2. Manufacturing of clothing/ footwear	5000	12000,00	2000000	pcs./pairs	166,67	8,10	0,76
Civil engineering (sector F)							
1. Construction company for interior repairs	300	720,00	100	Repairs/orders	0,14	134,98	12,59
2. Construction company for construction projects up to 4th category	1500	3600,00	4000	sq.m.	1,11	27,00	2,52
3. Construction company for construction projects from 3rd to 1st category	15000	36000,00	50000	sq.m.	1,39	2,70	0,25
Wholesale and retail trade; repair of motor vehicles and motorcycles (sector G)							
1. Grocery stores	1000	2400,00	100000	number of sales	41,67	40,49	3,78
2. Clothing and/or footwear shops	1500	3600,00	10000	number of sales	2,78	27,00	2,52
3. Household products and hardware shops	2000	4800,00	10000	number of sales	2,08	20,25	1,89
Transporting, Storage and Posts (sector H)							
1. Courier company branch/ office	2500	6000,00	15000	shipments	2,50	16,20	1,51
2. Courier company hub	5000	12000,00	365000	Shipments	30,42	8,10	0,76
3 Independent transport company	15000	36000,00	10000	pallet orders	0,28	2,70	0,25
Accommodation and food service activities (sector I)							
1. Hotel with 10 rooms	2000	4800,00	7300	Customers	1,52	20,25	1,89
2. Restaurant c 30 seats	1500	3600,00	10950	Customers	3,04	27,00	2,52
3. Café c 20 seats	350	840,00	7300	Customers	8,69	115,70	10,79
Other (sectors J, L, M, N, P, Q, R and S)							
1. Bank branch office	2500	6000,00	13200	bank operations	2,20	16,20	1,51
2. Pharmacy	1500	3600,00	36500	sales	10,14	27,00	2,52
3. Healthcare centre/hospital	10000	24000,00	73000	treatments/examinations	3,04	4,05	0,38

Source: Own calculations, based on the described methods

47. The "Agriculture, forestry and fishing (sector A)" is heavily subsidized. Their development in Bulgaria is not solely based on market conditions, and therefore estimations for that sector would be inappropriate.

The obtained results can be used to draw some significant conclusions, regarding the potential for localization. First, result over 1 does not necessarily mean presence of that type of business, on the other hand, a result over 5 does not mean that there are 5 plants next to each other. The interpretation is, as follows: In case of result over 1, but actual absence of such a company, this means that the regional economy of the municipality lends its market potential to another territorial system. If the result is 5 and over 5, but there are in fact 3 companies from the same sector, this means that they operate in a very good market potential and comfort. It is precisely these sectors, the threshold level of which is much higher than the minimum, and their range is vast. They have an advantage, which may vary between sectors and sub-sectors and requires an even more detailed sub-sectoral analysis or a specific business plan.

For example, Pernik Municipality, as is evident from the calculations in table, has potential for 27 pharmacies and 4 healthcare centres/hospitals. In the Bobov Dol Municipality these numbers are 2,52 and 0,38, respectively. Pharmacies require direct contact with customers and therefore these would only be concentrated in the largest settlements in the municipality and mainly in Pernik. This condition, as well as the additional restrictions, when opening a pharmacy, would not allow for this potential of a total of 27 units to be realized, but rather only a third of that quantity would be possible. Thus, those that do open, will operate in an environment of market comfort with large customer base and wide range. In Bobov Dol, there can be up to 2,52 pharmacies. This means that most probably there will be one or two pharmacies and they will definitely be in the municipal centre. As for the hospitals, Pernik only has 3 of them and an emergency centre, while the potential is for 4. This means that this capacity is almost fully realized. In Bobov Dol, with its value of 0,38, the threshold level has not been reached and there is no sufficient range for the occurrence of a hospital or healthcare centre. In this way, the healthcare system may be represented by an emergency centre or an individual medical practice.

These examples prove that the spatial parameters define the localization potentials. These are a clear sign that not everything can and will be localized everywhere, that not everything that seems necessary or appropriate, is necessarily just that. For example, Measures 312 and 311 of the Rural Development Programme (RDP 2007-2013) did not set any conditions, regarding the localization of guest houses, it financed. And so, after project completion, even bona fide entrepreneurs failed to utilize their capacity and operate very near the threshold level, due to the absence of a similar analysis.

Each individual type of goods has a very different threshold level and spatial market range, respectively. Generally, there will always be goods with low threshold level and small range, respectively, while others would have much higher requirements to the level of demand for their existence and thus – a much higher range of service (high threshold level goods). For example, foodstuffs, clothing and footwear are goods of low threshold level. Therefore, the facilities, offering such products, are virtually omnipresent. And the opposite situation – schools, hospitals and other specific operations create high threshold level products and therefore these are only available at the main locations Pernik and Bobov Dol.

4. CENTRAL PLACES PER W. CHRISTALLER – PERNIK MUNICIPALITY AND BOBOV DOL

Due to the limitations of the threshold level, it is obviously impossible to manufacture and supply every good everywhere, that is why trade exists. The frequency of manifestation of the points of manufacture is directly related to the rank of the goods. The localization analysis, must clearly differentiate between the conditions where local manufacturing is possible (good threshold level and range) and where these are not present and goods need to be delivered from another territorial system (through trade).

Low-ranking goods will be widely available, while high-ranking goods will only be available at limited number of locations. It is assumed that localizations are organized in a certain *hierarchy*.

“A place at a certain hierarchic level provides not only those goods and services, corresponding to its respective rank, but also all the goods and services at lower-ranking places”.

This means that all goods and services, offered at the villages in both municipalities, are also offered at the municipal centres – Pernik and Bobov Dol. And also, all the goods and services, offered in Bobov Dol are offered in Pernik as well, since it holds the top rank (regional centre) and it's the only village, offering the widest range of goods and services in the studied territory.

Structures of this type are self-organized and that is why all the goods and services, demanded by the population will be assigned numbers from 1 to n according to the threshold level. The good, assigned a 1 (e.g., *bread*), has the lowest threshold level, and the good, assigned an n – the highest. The good n, which also has the highest market degree, will have to serve the largest market areas. The actual number of centres and the number of market areas of that rank, respectively, depend on the volume of the demand for the good n. In this case, Pernik Municipality's population is 97 187 people and with a threshold level of 50 thousand people, this means that only one centre can exist – Pernik itself. This also applies to the Bobov Dol Municipality, but with a threshold level of 5000 people.

These are the manufacturing centres in the highest tier – *central places*. According to the NCSD Pernik is a tier 3 settlement, and Bobov Dol – tier 4. The next good, based on the threshold level ($n - 1$) will also be manufactured in the main centres, since these are the main consumers. The good ($n - 2$) can also be manufactured there, if it meets the requirements, regarding the threshold level. In the table above, these are the types of services and products with the highest threshold levels, requiring over 2500 households.

The process continues, while the necessary threshold level decreases and a certain good, supplied for the main centres will ultimately be reached, for which the market area would be so small, that it would leave a significant unsatisfied demand, beyond the rank of the main centre.

This condition would not give rise to the emergence of new points of manufacture of such good in the main centres, but this would rather take place in lower-ranking centres. In the reviewed case, these are the largest villages and small towns in both municipalities, for Pernik – Batanovtsi, Dragichevo Village, Rudartsi Village, Divotino Village. In the Bobov Dol Municipality these are – Golemo Selo Village, Malo Selo Village and Mlamolovo Village.

The process may continue until the establishment of as much centres, as there are hierarchical goods. For example, in the case of one more hierarchical level, lower-ranking centres will be situated, based on the same principle, as the centres above. Each and every such centre is located at a similar distance from three centres in the next tier. All the other settlements in both municipalities will be precisely of this third type. They have accumulated the most serious demographic and economic problems, the depopulation rate there is most significant – these are the smaller villages and hamlets.

Centres of each hierarchical level are characterized by a specific selection of goods in accordance with their threshold levels. There is no good that is unavailable or inaccessible in the largest cities. This means that these centres can in theory supply all goods, characteristic for their tier, plus all goods, characteristic for the lower-rank centres.

There is a direct ratio between every hierarchic level. This ratio is known as the *k*-value and shows that every centre (core) dominates a certain number of lower-ranking centres and their market areas in addition to its own market area.

Since each new hierarchic centre is situated at equal distance from three higher ranking hierarchic centres, this means that each new centre and its market area are “shared” by these three centres. This means that if a business emerges in the main centre, it would be able to rely on the market area of the smaller centres and incorporate them in its range. This is a *market principle* of localization, and the occurring spatial organization with $k = 3$. The reason to define it as market is the fact that it serves a maximum number of uniformly distributed consumers with minimum presence of central places. In this case – a single main centre for the Pernik and Bobov Dol municipalities. This situation ensures that each small centre is situated at an equal distance from the main centre *and* two interim centres. In fact, the smallest centres are not situated at equal distances, but may obtain areas (their lands), which are equally remote from the rest.

It is also assumed that the *k*-value, once determined in a region, remains hierarchically permanent for very long periods of time, and thus the number of centres and market areas at each hierarchic level increases, in accordance with its usual progression. The table below shows the approaches and growth rates for a five-stage hierarchy, where the main metropolis must supply goods of the topmost threshold level, as an equivalent of two cities (plus its own market), six towns, 18 villages, etc.

Table 5
System of the central places
at $k = 3$ for the Pernik
Municipality (per Christaller,
1933)

Theoretical distribution at $k = 3$

Hierarchical level	Central places, dominated by the highest-ranking centres	Market areas, dominated by the highest-ranking centres
1. Metropolis	1	1
2. City	2	3
3. Town	6	9
4. Village	18	27
5. Hamlet	54	81

Actual distribution at $k = 3$ for the Pernik Municipality

Hierarchical level	Central places, dominated by the highest-ranking centres	City/town/village	Market areas, dominated by the highest-ranking centres
1. Metropolis	0	Sofia – agglomeration shadow	1
2. City	1	Pernik	2
3. Town	1	Batanovtsi	3
4. Village with over 1000 people	6	Divotino, Dragichevo, Kladnitsa, Rudartsi, Studena, Yardzhilovtsi	9
5. Hamlet	16	All the other 16 villages	27

Actual distribution at $k = 3$ for the Bobov Dol Municipality

Hierarchical level	Central places, dominated by the highest-ranking centres	City/town/village	Market areas, dominated by the highest-ranking centres
1. Metropolis	0	Sofia – agglomeration shadow	1
2. City	1	Kyustendil	2
3. Town	1	Bobov Dol	3
4. Village with over 200 people	5	Mlamolovo, Babino, Dolistovo, Malo Selo, Golemo Selo	8
5. Hamlet	12	All the other 12 villages	20

The process of exchange is what determines the survival of both sides, i.e. – the individual production subsystems and the central places. This means that business is well, when the settlement is well and vice-versa. It also has a specific spatial form, due to the difference in the location of the points of demand and the points of supply. If one and the same consumer moves to a central place, in order to exchange a part of his revenues for goods and services, he must use resources with limited quantity (money, time, physical energy), in order to travel the distance. At a certain distance from the point of supply, these costs become so high that when added to the primary acquisition cost, they reduce his demand for such goods and services to zero. At such a distance, the process of exchange just stops, since the demand for such a good simply disappears (this coincides with **the range of the good**). It is important that both settlements Pernik and Bobov Dol, municipal centres, located very close to the metropolis, are in a situation, where they fail to retain a sufficient number of goods and services of high threshold level and range. If they managed to do that, the problem with the transition to a climate neutral economy would be a much easier task, because market demand would be high. This means that it is necessary to implement socially-based projects, which, however, should produce a market result, which causes the difficulties for restoring economic functions.

The hierarchic structure, as described above, is a stable state of the system of central places in the Pernik and Bobov Dol municipalities. At this stage of their development, centrifugal forces are much stronger than the centripetal. Their dynamic functional and spatial organization is **not in a state of balance** between incoming and outgoing flows and these two municipalities have been losing resources – population, economic activities, materials and energy for a very long period of time. The beginning of the end of the coal mining industry and energy generation, using that coal, apart from being a technological and environmental transformation, is also supplementing the processes that have also taken place in other economic activities in the municipalities.

The demand for goods and services by the population has not been effectively satisfied and people try to find solutions outside the territorial systems of these two municipalities – emigration and long commute. The functions of the central places themselves and their network hierarchy are not in a state of dynamic balance with their environment. The smallest settlements are in a state, which does not provide a potential location for any activities, requiring workforce, therefore they are only involved in the economic system with their land – agriculture, animal production, forestry, renewable energy from the sun and wind, water-catchment areas of water bodies, etc., but without an actual market potential for the settlements from the territorial system of the municipalities.

5. CENTRAL PLACES – MARKET POTENTIAL

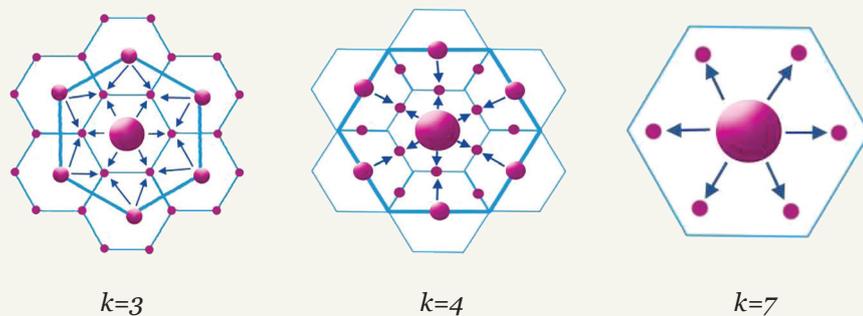
To better understand hierarchy between central places, new elements are added to the analysis. The most probable spatial form is the hierarchic distribution of the centres based on the market principle ($k=3$). Under these conditions the central places system is organized in accordance with two main principles. First – all the products, manufactured by the smallest centres are supplied in all parts of the hypothetical surface area. Second, it is assumed that the central place of a certain rank supplies

all goods and services, of its rank, plus all goods and services of the lower-ranking places.

The modification of either or both of these principles would result in alternative configurations in the hierarchic organization. Another couple of new hierarchic structures are offered (with $k=4$ and $k=7$), where a completely different spatial organization, referred to as transport and administrative.

The manufacturing of any good at any central place must meet certain minimum conditions regarding the market size. These minimum requirements vary between the goods of different rank and threshold level. In the original system, the market areas distribution is fixed and uniform in the grid configuration, depending on the applied principles– market, transport, administrative.

Figure 13
Spatial orientation
(Christaller, 1933)⁴⁸



The three solutions represent the spatial reorientation of one and the same logical framework. The originally specified value of k remains constant, and the hierarchic organization of the centres and market areas follows the strict assumptions. Market areas, containing only 3, 4 and 7 centres prove to be the smallest and non-representative series of solutions, but since the settlement structure of the Pernik and Bobov Dol municipalities are of the “primary” type, they meet the conditions.

Through additional changes to the size and orientation of the hexagons k may take the values 9, 12, 13, 16, 19, 21, as further values can also be determined. Some market areas are impossible to occur and therefore these will not be included in the series of calculations. Contrariwise, the values of k , which do not permit sharing of market areas, such as 7, 13, 19, are more likely to occur in reality, because these are based on complete domination over the neighbouring market – this is the case with Pernik, regarding Sofia and Bobov Dol, whose market potential is shared between calculations Sofia, Kyustendil and Dupnitsa.

This is the situation in the SWR and Sofia’s agglomeration shadow. The regional and municipal centres have a value of $k = 7$ where for many activities, Sofia does not share its market area, on the contrary – it consumes from its adjacent regions. This fully applies to the activities: higher (university) education, medical services, management, security and defence, the main part of the judicial system, IT and software, as well as the largest commercial hubs and major store chains. As a result of this process, the

⁴⁸ t.ly/QvnM

population growth rate is negative for all regions in the SWR, except for Sofia City, and in 2020 – including Sofia City⁴⁹.

Under these conditions, any good, in order to be offered within the central places system, should “choose” the nearest suitable market in accordance with its size, among all other possible solutions. In this way, the market product grid area can be predicted and estimated, in accordance with the chosen k value. In fact, all businesses, having good rates of return, need qualified workforce and are characterized by a high threshold level and range, choose Sofia. Planning and programming the central places, future projects and activities in the target territories with respect to the just transition, must always take into consideration this spatial configuration, which will cause disbalances in the development of the SWR and Bulgaria in general for a very long period of time.

In the analysis it is assumed that spatial organization of the urban centres is fully compatible with one of the specific principles of human organization and behaviour: “*the principle of least effort*”. It should be noted that not only the system itself creates the differentiation between “rich” and “poor” areas, but this also occurs within the centres, to the cities themselves. The borders of the “rich” areas in the localization of the centres of different significance also vary, especially when getting farther away from the first rank main centre. For example, while getting farther away from the main centre, the size of the major centres also increases. The interpretation of these spatial rules means that after Pernik, the first two cities which are also high-ranked centres, are Kyustendil and Blagoevgrad in Southwest Bulgaria. This means that Bobov Dol is located in the shared market area between Sofia, Pernik, Kyustendil from size rank A and nearby market area of Dupnitsa as rank B size. **Taking into consideration of the processes in the coal industry, the process of just transition and the demographic processes, it may be concluded that in the Bobov Dol Municipality there is no central settlement, which would generate market incentives for localization. Thus, localization would only be possible through a focused programme and/or a set of state supported projects, such as the Mechanism for just transition, for example.**

With view of this conclusion, the central places provide a good opportunity. It is related to the fact that the Thus, rank A sized cities can be viewed as the central place for an entire region, where all possible goods and services are manufactured and supplied. There is no, however, a fixed relationship between the type of goods manufactured and the lower-ranking centres. For example, a hypothetical good X is manufactured in the main city, but also in two other lower-ranking centres – B centres. The condition that a centre of certain hierarchical level will supply the goods to all lower-ranking centres, is thus not met, with the exception of the main centre. In fact, the good X is supplied (manufacturer) in two other centres, apart from the main market centre. The sole condition for this to happen is that the market interest of the A centres, is not affected by the interests of the B centres, serving it. This is the foundation for all fact, the proposals in section 6, permitting new manufacturing of goods, which do not belong to the rank of Pernik and Bobov Dol, but serve Sofia and the other A centres in Bulgaria. No newly occurring company is capable of detaching itself from the market gravity of the A centres, but an external

49. t.ly/sNIL

investor company, holding a market area in *A*, is capable of doing that (*Scenario 3 in the just transition report, WWF 2019*).

With such assumptions, the system brings forth the conclusion that movements would be characterized by linearity along specific main roads. There are two fast road connections between Sofia and Pernik. This enables Pernik to lead a more independent market policy and, in the future, use its workforce for the economy of Pernik, a process which will be enhanced through time. Second, Bobov Dol is directly connected to the Struma Motorway in three directions – towards Pernik and Sofia, towards its regional centre Kyustendil, towards Blagoevgrad and Thessaloniki.

Although the variations in population density, as is the case of the Bobov Dol and Pernik Municipalities, cause certain deformities, a significant part of the spatial organization is preserved in an organized and regular form. In other words, the hierarchic structure of urban centres exist in the real world, despite all types of spatial and, in the future, disbalances concerning population, market size, purchasing power or any other factor. These conclusions can be made, due to the specific threshold level and range, which are the minimum necessary condition for any good or service and are the focus of attention in the implementation of any future investment project and its localization.

6. RANK 2 GRAVITATIONAL FORCES IN THE SOUTHWEST REGION

To improve the understanding of the localization process in this type of spatial hypothesis and organization, it is necessary to test it in a real-life economic environment. Therefore, it is reasonable to ask, whether the actual spatial organization of the economic system of the Pernik and Bobov Dol municipalities, are related to the principles of spatial organization, as described based on the above assumptions.

The general objective of this section is to test the spatial economy model in a simplified environment against the real world. In order to achieve this objective, we should add to our observations, the maximum number of conditions and factors, which could be relevant. Until now, a single variable determined the spatial approach of localization, both of the threshold level and range, and of the central places. When allowing an additional variable, distance itself will remain a significant factor in constructing the spatial organization, which will probably be seen, when observing the real-world situation. In this analysis of central places, three further main conditions are permitted, which will ensure the characteristics of the model in a simplified environment:

1. Urban centres are organized hierarchically. Each level in the hierarchy is characterized by:
 - a) a specific functional structure; and
 - b) specific distance of interaction with the uniformly distributed centres if the same hierarchical level.

These two conditions reflect the respective threshold levels of the different goods and services, as well as the range, where these are demanded.

2. The spatial organization of manufacture is based on circular areas of land use, around urban centres;
3. The movements (frequency) generally decrease with the increase of the distance.

Empirical studies, related to **the hierarchic organization of cities and villages**, always have impact on the central place function of the urbanized centres of all ranks. Due to the transitions from one technological system to another (which is one of the reasons for the just transition), which are well-marked by the K^{50} waves, researchers **do not** rank first the spatial organization of the individual economic sectors. They see it as a secondary product, where periods, related to spatial reorganization of their territorial structures, occur at an ever-increasing frequency and power of manifestation. Therefore, they cannot fully play the role of a benchmark in the formation of the spatial organization of the economy. This hypothesis is so strong that its manifestation is also a fact in the latest theoretical framework – the New economic geography, which is not applied in this report for objective reasons.

In the traditions of the Bulgarian economic geography, even now the spatial organization of the economic sectors continues to play a superior role. Therefore, cities have functions only if they are assigned economic activities in the system of the centrally planned economy, and the urban network as the main market driver for the spatial organization of the economy is **severely underrated**. Therefore, the breaking of sectoral connections, impaired the functions of entire settlements, as some of them failed to overcome the impaired connections. The logic behind this condition can also be found in the fact that Bulgarian settlements never lived through all the stages of capitalist development and accumulation. **Now, implementing projects, financed by the EU, Bulgaria once again develops an economy, close – in terms of logic – to a centrally planned economy, where the main actor and conceptual entrepreneur is the state itself, through its various programmes. This situation is characterized by a high level of risk for the market, competition and the effectiveness of the decisions made.**

Literature contains various names and categories of settlements, which take part in the formation of the hierarchic structure, since in different countries there are detailed differences between these settlement categories. Therefore, our example starts from 1 (the lowest level) and moves up. Another specificity is that the levels of hierarchy, which can be identified in the specific region, analysed here, are largely varied. For example, it is possible that the hierarchy only consists of 3 or 5 levels. This is very likely, when attempting to determine the level of hierarchy and the number of central functions, performed by small and very small villages.

50. Kondratiev waves, also known as K waves. These are 50-55-year cycles, following the level of prices in world economy. Each K wave starts with a technological change, which is the trigger for its start. At present, we live at the end of the fifth K wave, referred to as "Disorganized Capitalism".

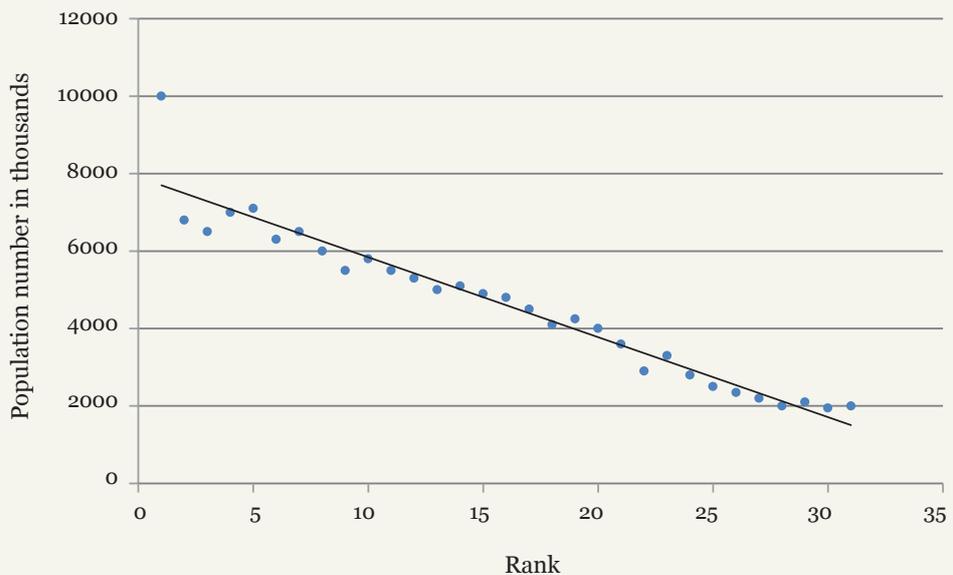
In such studies, the largest settlements may be intentionally excluded in order to eliminate the “interference effect”.

The connections of urban centres, expressed with the number of their population, are also proven by another empirical dependency. It is manifested in the following assumption – if settlement centres are arranged in descending order, based on the number of their population, it is often established that the size of the centre is conversely proportional to its rank. Developing this dependency, based on the “rank-size” rule⁵¹ makes it statistically significant. Symbolically it is expressed as follows: the number of the population of each settlement of rank r is equal to the number of the population of the largest city (first rank), divided by the rank of the city/town that is being defined (q is an additional quantity, with a usual value of 1):

$$P_r = \frac{P_1}{r^q}$$

When this equation is represented on a logarithmic scale, the relationship is manifested as a straight line, a gradually decreasing line with inclination -1 .

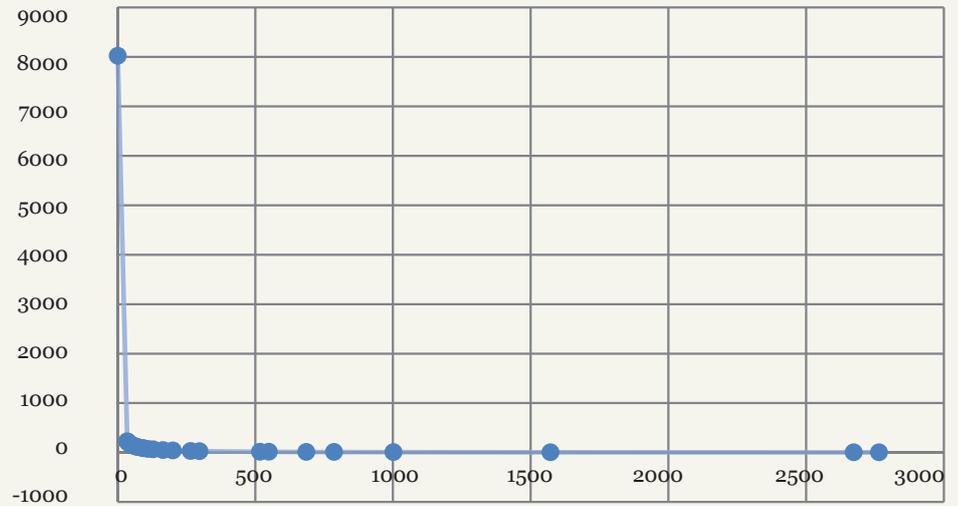
Figure 14
Theoretical settlements
distribution curve according
to the “rank-size” rule



Data source: NSI

51. Zipf's Law (G. K. Zipf), named after the Harvard linguist prof. George Zipf (1902 – 1950), is a function for observing the frequency of manifestation of a phenomenon (P) as a function of a rank (i); when the rank is determined based on the highest frequency of manifestation: $P_i \sim 1/i^a$, where a converges to 1.

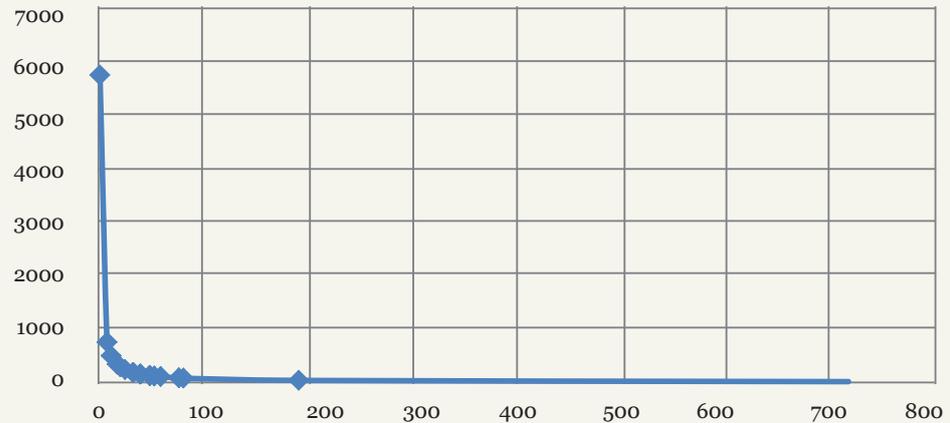
Figure 15
Settlements allocation
according to the „rank-size“
rule in Pernik Municipality



Data source: NSI

Pernik Municipality	Rank	Population
PERNIK	1	80191
BRATANOVTSI	35	2263
DRAGICHEVO VILLAGE	38	2121
DIVOTINO VILLAGE	42	1911
STUDENA VILLAGE	44	1819
RUDARTSI VILLAGE	59	1362
KLADNITSA VILLAGE	67	1202
YARDZHILOVTSI VILLAGE	74	1079
MESHTITSA VILLAGE	92	873
LYULIN VILLAGE	94	849
GOLEMO BUCHINO VILLAGE	110	726
KRALEV DOL VILLAGE	130	619
BOGDANOV DOL VILLAGE	165	486
RASNIK VILLAGE	201	399
CHERNA GORA VILLAGE	266	302
VITANOVTSI VILLAGE	298	269
BOSNEK VILLAGE	517	155
SELISHTEN DOL VILLAGE	549	146
LESKOVETS VILLAGE	685	117
VISKYAR VILLAGE	786	102
ZIDARTSI VILLAGE	1002	80
RADUY VILLAGE	1572	51
PLANINITSA VILLAGE	2673	30
CHUYPETLYOVO VILLAGE	2765	29

Figure 16
Settlements allocation according to the „rank-size“ rule in Bobov Dol Municipality



Data source: NSI

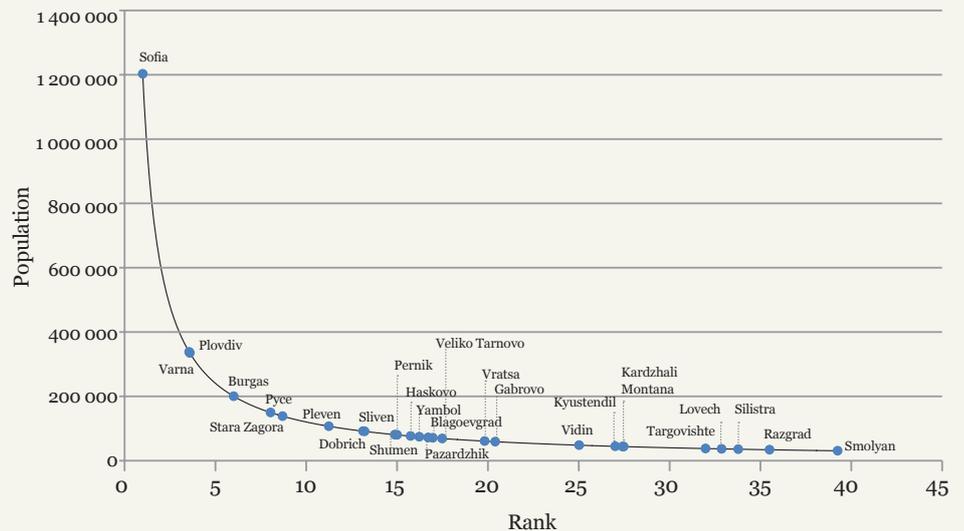
Bobov Dol Municipality	Rank	Population
BOBOV DOL	1	5737
MLAMOLOVO VILLAGE	8	742
GOLEMO SELO VILLAGE	12	488
MALO SELO VILLAGE	17	328
DOLISTOVO VILLAGE	20	280
BABINO VILLAGE	25	229
GOLYAM VARBOVNIK VILLAGE	33	175
KORKINA VILLAGE	33	175
MALA FUCHA VILLAGE	40	145
GORNA KOZNITSA VILLAGE	40	144
GOLEMA FUCHA VILLAGE	49	118
SHATROVO VILLAGE	49	117
MALI VARBOVNIK VILLAGE	53	108
BABINSKA REKA VILLAGE	59	97
NOVOSELYANE VILLAGE	76	75
PANICHAREVO VILLAGE	81	71
BLATO VILLAGE	191	30
LOKVATA VILLAGE	717	8

As expected, the Pernik and Bobov Dol municipalities have exceptionally identical settlement profiles, very different from the theoretical distribution. This means that the settlement structure is disbalanced, dominated by the main city/town, while the other settlements in the municipality are sources of population, workforce, consumers, taxes, resources, etc. Some of these settlements have already reached population of less than 200 people and are completely perishing. There are no incentives for market-based investments there whatsoever, the sole option is using funds or governmental spending, as well as the use of their land resources.

Back in the 1960s, numerous studies of cities were performed in many developed countries around the world, based on the “rank-size” rule. In one-third of the sample, distributions were mainly according to the “rank-size” rule, as is the case with Pernik and Bobov Dol. The rest display an interim position. These differentiations are affected by a number of factors, such as the stage of economic development, duration of the urbanization process, political processes and changes, etc., which have occurred in Bulgaria too-often, from the perspective of the economic cycles. A very important conclusion is that: *the more complex, socio-economic life of the country is, the closer its cities’ development will be to the “rank-size” rule, as the system of the cities will represent the “stable state”*. Bulgaria’s EU membership resulted in stabilization of the Bulgarian macro-economic indicators, but the negative demographic processes decreased a part of the positive effects. Even in the largest cities, where the population is not decreasing and is even slowly increasing, the urbanization processes are hectic and only reach the new development level in planning. This results in spatial expansion of the cities in terms of planning, but does not improve the environmental indicators, quality of life and most importantly, it fails to enhance the functions of the cities.

An evidence for that is that the significance and rank of a city remain constant in time. It may increase, but it can also decrease, as Bulgaria is a good example in this relation. Within a 20-year period, due to the enormous decrease in the population compared to the size of the country, almost all regional centres lost functions, based on the “rank-size” rule. Thus, Bulgaria also has the typical primary distribution of the cities, based on the said rule.

Figure 17
Distribution of the 27 regional cities of Bulgaria, according to the „rank-size” rule



Source NSI, 2021

The Figure shows Sofia's exceptionally high position in the regional cities system. The next two cities – Plovdiv and Varna, lag far behind the capital city. All the other 24 regional cities have less than 200 000 people. The least significant regional city – Smolyan has a rank of 39, which is much lower than the arithmetic total number of 27 cities. The city – regional centre, included in our analysis – Pernik, ranks 10 by its population, but in Bulgaria, according to the “*rank-size*” it ranks 15th, which means that it loses 5 positions to Sofia, also lending the capital a large portion of its marketing and labour potential. If this structure of relations and ranks between the Bulgarian cities – regional centres, and the capital city remain unchanged for a long time, investments on other cities would be able to slow down, but not to reverse the severely aggravated negative processes.

Another extremely important factor, inherent to models in a simplified economic environment is included here – the migration of the consumers towards the centres. This is the force, triggering the entire system and making possible the flows of energy, money, goods and people. These migrations of consumers correspond to the suggestion of the central places theory. Nevertheless, this question is much more complex than the ones, reviewed so far, because it includes assumptions regarding the place's spatial behaviour of the consumers themselves. The data for people's spatial behaviour are limited, often based on sparse observations, have no constant nature and are subjective.

In Germany⁵² it is considered a standard for daily commute to last up to an hour and a half and to take place within 100 km. This means that the population, living near the network of urban territories rank *A* and *B* and works and shops there, does not change its location, but travels on a daily basis. This leads to the preservation of several important factors:

- The main city/ies benefit/s from the population of the periphery both on a market and labour basis, and grow/s;
- The transport system develops anticipatorily in accordance with the intensity of travel – motorways, railway transport and multi-modal transport stations;
- The smaller settlements – centres *B* and *C* (towns and villages) do not lose their population. They preserve their core residential functions, provide services, develop their market environment, their quality of life, do not lose real estate value. Their settlement economic system functions.

Had the Bulgarian motorways been completed 3 decades earlier, including to all the border crossing points with the neighbouring countries, and all the regional cities, the dominant type of migration would have remained the labour migration (daily commutes). However, since Bulgaria still has not completed its basic road infrastructure, even the population, living in the regions Pernik, Kyustendil, Sofia Region, needs to move permanently to Sofia, in order to study or live there. This is a significant defect of the Bulgarian spatial-transport structure, causing serious problems to the regional development, generating uncontrollable disparities and consuming the resources for growth of the secondary settlement centres.

52. Spatial Development and Spatial Planning in Germany, Federal Office for Building and Regional Planning, Bonn, 2001

Central places, based on the functional characteristics of the cities, prompt consumers to travel to the nearest possible centre, where they can satisfy their direct needs. However, the frequency of the manufacturing and supply of a good in space (the centres), is in inversely proportional to its threshold level for manufacturing – thus goods with the highest threshold level will be offered in the highest-ranking centres, which will have a significant spatial market impact (hexagons with the largest surface area). This means that the distance that needs to be travelled, will depend on the threshold level and the range of the good. For example, food production and supply is a typical example of low-threshold level goods and therefore, the demand lines show that purchases take place, based on the least distance principle. Since foods are severely stylized, standardized and uniformed, their price is very similar. The sole factor, which would have an impact is the proximity of the respective site to the consumer. Thanks to the little distance, consumers would economize on the value they can influence the most – time. This situation is particularly valid in larger cities, where traffic is intensive and spare time – limited. This is the case in Pernik, but not in Bobov Dol. There, travel can take place due to the fact that Bobov Dol does not offer such type of products or services at all. In most cases, the nearest store in the respective settlement is the chosen location all other conditions being equal.

The leading companies that build stores, exchanges and other facilities, look for this precise factor – effect, which is outside of their marketing strategy, but would always work to their benefit. Therefore, the locations, benefiting from these advantages, also have the highest market price in the localization.

The middle ground is occupied by goods, such as clothing, which have long and short demand lines at the same time, depending on the product. For example, when buying daily clothes, the demand lines would be very short, similarly to the foods. On the contrary – the demand of premium fashion clothing would have long lines of demand, reaching the main city, top-ranked in the region.

People, in demand of goods with high threshold level are in precisely the opposite situation. The lines of demand are much longer than those of foods. If it is necessary, for example, to use a specialized medical service, requiring highly qualified team and equipment, all travel would be directed towards the main centres in the central places system.

According to this conceptual basis, travel takes place, not only in the area of healthcare, but also of education, culture, fine arts, administrative governance, etc. Thanks to them, major cities focus in themselves all the activities, on which the entire population of the country depend. This makes their role particularly significant, but also gives rise to serious disparities.

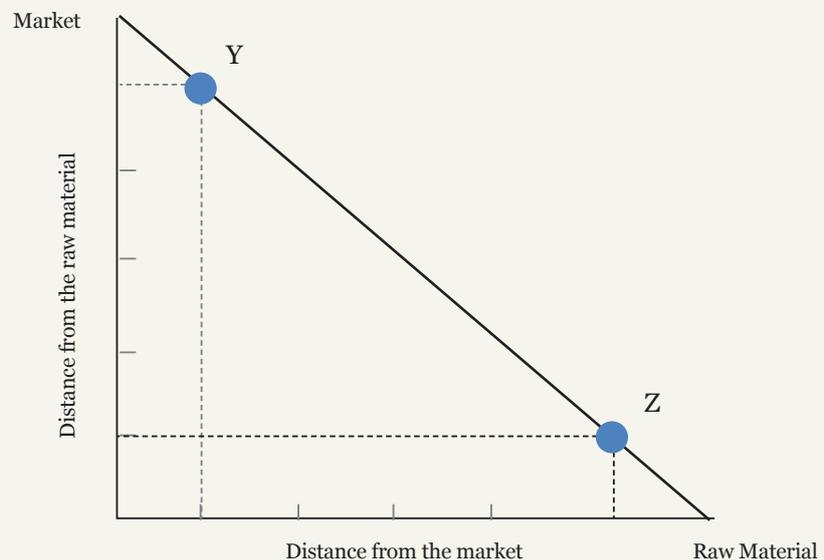
These examples may be reproduced in different time and spatial scale, and they prove a degree of interchangeability with the central places and central functions of cities. The travelled distance varies with respect to the goods of different levels and second, there is a significant difference between the distance of “maximum purchases” and those of the “nearest purchase”, which means that consumers do not buy the most from the nearest market point. This also depends on the level of the good. The differences in these two values are very little in low-level goods, and vice-versa with respect to goods of the highest level – consumers are ready to travel far from the nearest centre, to find what they are looking for.

A contemporary example is the positioning of hypermarkets of an electronics, furniture, appliances, cars, fashion or other companies, outside the nearest neighbourhood locations. They are looking for good transport location and area, which would allow them to build the necessary infrastructure (parkings, recreational areas, loading and unloading areas, etc.). This location would allow quick movement of the consumers, quick access to an enormous number of similar or alternative goods in terms of price and functionality “under one roof”, which would significantly facilitate the purchasing decision. A similar spatial strategy is also applied by the modern retail centres – malls, but they host various competing companies, offering mainly medium- and high-level goods. Through this model they solve the transport problem to the benefit of the consumers, gathering at one point, a wide range of goods. If a consumer wishes to visit 10 luxury -shoe-shops in downtown Sofia, they will have to travel a distance of several kilometres. If such consumer visits a single mall, they will be able to see the products of these 10 alternative shops within several hundred meters. Nevertheless, these centres also offer and foodstuffs, since they know that the consumers would not mind using their travel for purchasing medium- and high-level goods, to also buy lower-level goods. This will save them time and expenses. Thus, travels will gradually become less frequent, since the consumers will not have to make a separate trip for each type of good. A cumulative additional effect is achieved, which is displayed by the number of visitors to these retail centres. On the contrary, places, only selling low-level goods, have a narrower range and the number of consumers they attract gradually drops. As a result, lower-level goods, offered at higher-ranking cities, have a wider range, as compared to the range of the same goods, offered at the lower-ranking centres. This is evidenced by the fact that consumers, residents of lower-rank centres (villages), travel to the higher-ranking centres for high-level goods, but also buy lower-level goods there, i.e., foods. **An innovative product for Pernik and Bobov Dol would be the establishment of an exchange, market-place or another type of trading structure for product or products, which are not offered elsewhere with such volumes and diversity. This would draw consumers towards them, since they offer lower operating costs and will provide additional benefits. An additional incentive is provided by online trade, which overcomes certain defects of the market place and converts it into available stock with the necessary operability for repackaging and dispatching the respective goods to the customer.**

7. WALTER ISARD'S SUBSTITUTION PRINCIPLE

This method expands the scope and analytical flexibility of the localization analysis, putting it in the context of the so-called substitution analysis. This type of technique does not significantly increase the applied aspect, but transforms it into a strong prognostic tool. Isard's logic is shown on fig. 18, where the problem with the two possible locations must be solved. It is assumed that the localization may occur at any point of the straight line, connecting the raw material and the market – a situation, where the raw material is “pure”⁵³. At that point of the location there are two variables – the distance to market and the distance to the raw material. The resulting transformation line reflects all possible substitution relationships for the two variables.

Figure 18
Transformation line for a
localization problem with two
options

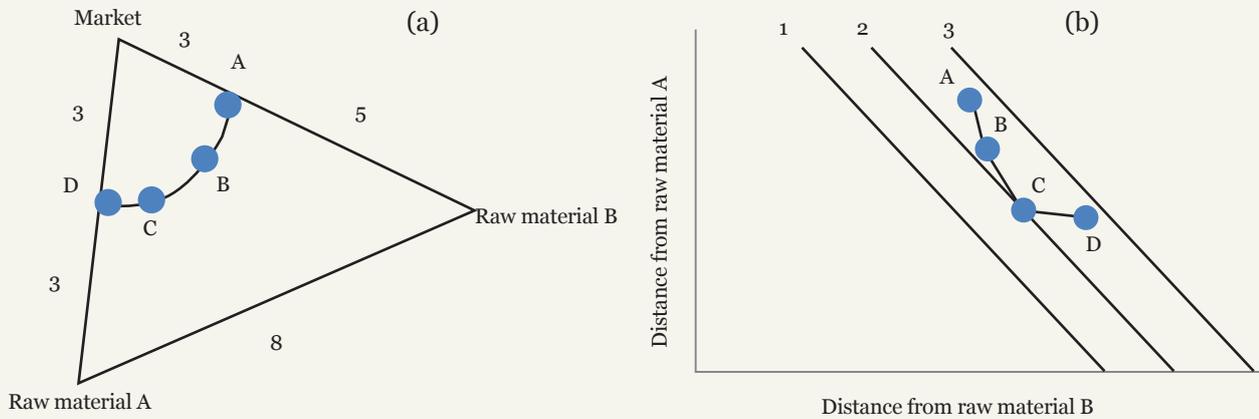


Localization at point Y means using 5 units of transport for the raw material and 1 unit of transport for the end product. If the localization is effected at point Z, the manufacturer will get a completely inverted, substitution configuration regarding the transportation of the raw material and the finished product. Subsequently, the inclusion of a second raw material, results in a significant complication, since there would then be three substitution variables, as a transformation line may be drawn for each of them subject to the following conditions:

1. For all distances from the market, there will be a transformation line between the variable distance from raw material A and the distance from raw material B.
2. For all distances from raw material A – between the variable distance from the market and from material B.
3. For all distances from raw material B – between the variable distance from the market and from material A.

53. Pure material is one that does not lose weight during processing and does not generate waste.

Figure 19
Localization decision with three options (per W. Isard, 1956)



The interpretation of the Figure for the Pernik and Bobov Dol municipalities would be, as follows: Pernik should reverse the configuration of the substitution frame towards itself from Sofia. At present raw material A for Pernik is the workforce commuting to Sofia. Since it is a mobile force, it carries out its long commute, spending a large proportion of its worktime for travelling both directions. The investment that has to be realized in Pernik should be with a volume, equal to the value of the commute time plus the relevant expenses. All other conditions being equal, the workforce would prefer to stay and work in Pernik and the region, if the total expenses for time and commute are offset by the economies. Furthermore, job creation in Pernik would boost the regional economy, the elevated supply and certain market services will increase their level on a local level. The city would attract the workers in its own municipality and make use of its resources. This is the starting point for changing Pernik's position vs Sofia.

The implementation of a strategy regarding the substitution frame of Bobov Dol is not to be directed towards the regional centre Kyustendil, which has completely different needs, but towards the municipal centre Dupnitsa. Employment data shows that over 80% of the employees of TPS Bobov Dol come from the Dupnitsa Municipality. This municipal centre logically meets TPS's need of workforce, this labour migration and process will affect the future recultivation of the mines and proves Bobov Dol's difficulties in providing workforce, even in a specialized sector. In order to overcome its dependence on the workforce from Dupnitsa, Bobov Dol should refocus on activities that do not use that type of workers, and do not operate at the scale of hundreds of employees at a single company. Bobov Dol's substitution strategy must be based on what no one else in the region has, and these are the mines themselves. There are numerous projects in the EU, where obsolete mines have been transformed into parks for visits, museums, entertainment areas and after the necessary utilization and socialization, they can be actively incorporated in Sofia's tourist region, but not only declaratively. In this case, the proximity to 4 regional cities – Sofia, Kyustendil, Pernik and Blagoevgrad, will be redirected to the benefit of

Bobov Dol. A “substitution” of resources and flows towards Bobov Dol, and not from Bobov Dol towards them, as is the case now.

The second figure shows the transformation line between the two variables. The common optimum localization is determined by finding the point with optimal costs for each of these cases and using the results from the first two, as the basis for the ultimate decision. The left part of fig. 21 shows the first of the three possible cases, where a certain distance from the market – in this case three units – was assumed. The right part of the Figure illustrates the transformation line for the variable “distance” from raw material A and from raw material B, consisting of locations along the curve AD. In this situation it is assumed that the localization may be effected in only one of the four possible points along the curve, since these are the only points, situated on transport routes between the materials and the market. Pernik’s task is to determine, which are the businesses, which would retain the workforce in Pernik, and Bobov Dol’s – which is the project, which would make people deviate from the speedways leading to the major cities and enter Bobov Dol.

The optimal location would be the one, requiring minimum transportation costs for both raw material A, and for raw material B, i.e., there should be value for the worker, value for the investor, also ensuring economies of time for both parties.

If it is assumed that from both materials, equal volume of manufacturing will be required per unit of output, as well as that the transport costs would be identical and proportional to the distance, three theoretical isolines of the costs (1, 2 and 3) are obtained in fig. 21 (b). These show the possible combinations of the two variables (materials/resources), which can be supplied at the same costs. The optimal location would be the point in the transformation line, lying closest to the theoretical line of costs, in this case – point C. The situation is a model of partial economic balance, which can be used to determine additional locations for businesses, allowing the distance to the market to vary within certain limits.

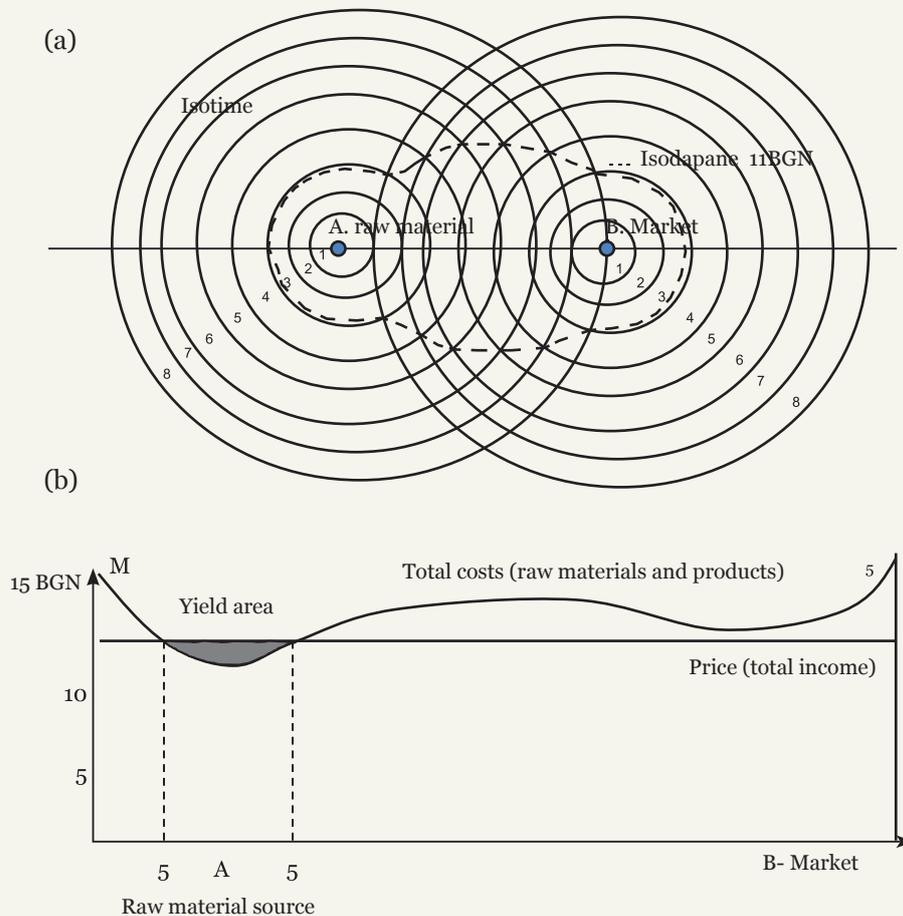
For the Pernik Municipality such a point of balance, would be the achievement of a number of commuters towards Pernik, equal to that of the commuters towards other locations, incl. Sofia. For the Bobov Dol Municipality, the point of balance would be the creation of as many jobs in other sectors, as is the number of commuters to the mines and TPS Bobov Dol, coming from Kyustendil and Dupnitsa. This would establish a completely new spatial point of balance for Bobov Dol’s municipal economy. If the Bobov Dol Municipality manages to overtake the Dupnitsa municipality in this process, it will continue to use its workforce, but in a much more effective manner than it does now.

8. SMITH'S COST CURVES

Here, the decisions are made based on a localization method with a number of advantages. This method can be applied in relatively complex localization situations. In this case a version will be presented, assessing the significance of the transport costs for the materials and end-products for the localization of the industry. The reason for this is that the Pernik and Bobov Dol municipalities are expected to accept on their respective territories new industries, which would use the workforce, made redundant from the coal mines and TPS.

When investigating the significance of the secondary factor, i.e., it is precisely the workforce costs, a transport costs minimization method is developed, based on the localization approach. The lines of equal transport costs around each point of raw material and each market are first defined. If movements are possible in all directions, the transport cost lines will have the shapes of concentric circles. Connecting all the points of intersection of possible combinations, would produce the common line of costs. In this case the point with the lowest transport costs is the lowest point on fig. 20(b) at point A, which is the source of raw material. The process continues until the respective surface area of the specified transport costs is established. This is point A – the source of the raw material, on fig. 20.

Figure 20
Surface area of transport cost lines (a) and space cost curve (b). (per Smith, 1956)



Two important concepts result from this analysis:

The first concept is that about the space cost curve (fig. 20, b), which represents a sector, drawn based on the cost contours from fig. 20, (a). The lowest point of the curve is the place with the lowest localization costs, the lowest transport costs and presents a solution of the localization problem, based on Isard's substitution frame. The inclination of the curve provides information regarding the relation of the specific business to the costs, arising from the overcoming of the distance (localization effect). Those, having significant localization weight, have steep curves, while the curve of those with lower weight is less inclined.

The second concept arises from the “space cost curve”, i.e., the spatial yield margins. The manufactured products are sold in the space of the same price. This, apart from being convenient, also represents an actual market situation. At a certain point in the space of the total costs, outlined by the cost isopleths, there is a contour, which would coincide with that price. It is the spatial yield margin, according to the linear model, shown on fig. 20. Within the margin, there will be yield, and outside of it the result will be loss. *In this situation, entrepreneurs may be spatially located aside from the point of the lowest costs and still survive, achieving yields.* Apart from that, other factors would also permit them to stay within the yield area. **This is a particularly important conclusion for Bobov Dol, which is situated away from the main roads. A number of real-life localization solutions are used by this type of analysis, as these are not located at the points with the lowest costs, but are still within the yield area.**

Let's assume a future dried fruit processing, raw nuts and healthy nutritional bio-mixes, based in Bobov Dol, making its main sales in Sofia. If the factory only has three corporate stores⁵⁴ in the metropolis, their location can be imagined as three sources of end-products. Adding an online store, the potential market will be each and every home or office in Sofia – dispersed nature. The manager of the chain would position his stores in three districts of Sofia that are densely populated. With respect to the orders, he always tries to bring the customers to the yield area, as per fig. 20, (b) and there are three main situations.

- First, it is announced that the delivery of the orders for several of the nearest districts, irrespective of their value, would be free, i.e., these are the areas with isotime up to BGN 2 all other conditions being equal;
- Second, for the districts, outside the list with the lowest transport costs, the delivery above a certain amount would still be free, which would incentivize customers to order more, when receiving a product, instead of paying for transport (substitution frame). Thus, the stores would directly influence the price factor and bring the delivery into the yield area.
- In the third case, if the distance is too long, irrespective of the value of the order, the delivery will be charged at a certain rate, since the market is situated outside the theoretical spatial yield curve. In this situation, additional factors, such as the accumulation of several orders for one and the same district, could have an impact, which would trigger economies of scale.

54. Only the shops in Sofia cover the minimum threshold level of demand. The retail network of other companies is used in other cities.

None of these customers is situated at the point of the lowest costs (these are the stores themselves), but each of them may be brought to the spatial yield area, with some extra costs. Furthermore, if the source of fruit and nuts is from the Kyustendil region, the factory, localized in Bobov Dol will be brought into the yield area through the materials, the access to workforce and its proximity to the Struma Motorway.

Should these conditions of the localization analysis be not met, the investments would only be sustainable until the implementation of the projects for their financing. After that, these shall become unsustainable and disappear. In other words, we must be sure that spatially, business will manage to remain the yield area and persist.

9. ECONOMIES OF SCALE AND CIRCULAR ECONOMY

This section is dedicated to two mutually complementing concepts, as the first ensures economic efficiency, and the second environmental efficiency. Figure (fig. 21) shows that there are several options for cost curves, depending on the scale of manufacturing. Even the localization under restrictive conditions, resulted in many conclusions regarding the localization potential of the Bobov Dol and Pernik Municipalities, which – if analysed at the same time with all variables, would not stand out.

When economies of scale are assumed, the situation will change substantially, since the benefits of the scale will vary significantly, depending on the volume of production, according to one of the three possible options, and there would be no difference, whether the funding of the establishment of the new enterprise is private or public.

As a rule, if a manufacture grows in absolutely direct proportion to the level of investments, this is referred to as **permanent benefits from scale**. The analyses in the preceding sections are in this logic group. If manufacture grows faster than investments, this is a case of **increasing benefits from scale** and vice-versa, when the amount of the manufactured products increases at lower rates than the investments, this is a case of **decreasing benefits of scale**. With curve, inclined downward, the economies of scale increase with increased manufacture, and decrease if the curve becomes inclined upward with the increase of manufacture⁵⁵. Before analysing in detail the matter of the impact of the “economies of scale” factor on localization, the reasons, affecting the costs per unit of product, depending on the size of the new future manufacturing companies, will be discussed.

55. This issue is well described by the (Cobb-Douglas) function, developed in the first half of the 20th century. Cobb – Douglas form of a production function, used to represent the relationship between output and factorial inputs. Statistically, this method was tested by Paul Douglas and Charles Cobb in 1928. For industrial production, the form of the function is, as follows:

$$Y = AL^{\alpha}K^{\beta}$$

where: Y is total production

L = labour input

K = capital input

A, α and β are constants determined by available technology.

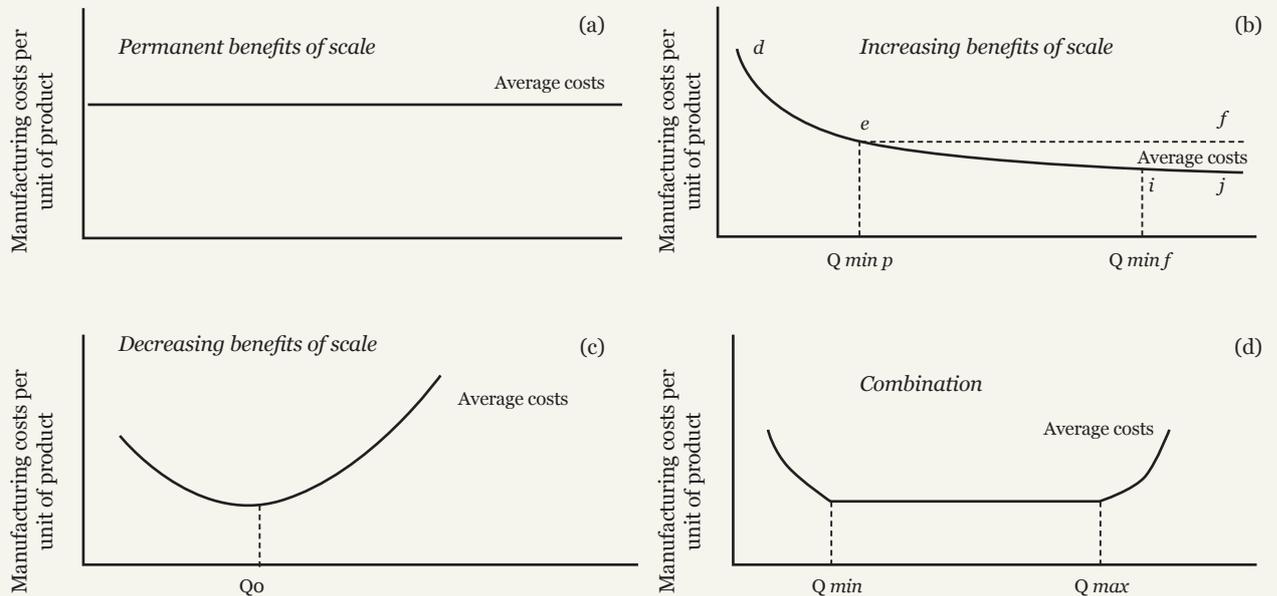
Conditions of the model:

If: $\alpha + \beta = 1$, the production function has constant returns to scale. This means that if L and K increase by 20%, Y will also increase by 20%;

If: $\alpha + \beta < 1$, returns to scale are decreasing;

If: $\alpha + \beta > 1$, returns to scale are increasing.

Figure 21
Possible options of cost curves according to the manufacture model



The specialization of the workforce and equipment are important factors for achieving economies of scale. The Pernik and Bobov Dol municipalities for a period of 40 years have achieved exactly that in the area of coal mining and the operation of the TPS, and Pernik – in the area of non-ferrous metallurgy. By virtue of the systemic approach, every manufacture may be reduced to small processes. **The common rule is that the smaller the enterprise, the more probable it is that each worker would be involved in a multitude of these processes.** Enterprises, which would be established as a result of the transition to climate neutral economy will be mainly small and even micro. This means that a worker must have skills and experience in multiple activities, but what is more important is that this means *higher cost of time and energy in transitioning from one production process to another*.

At a large company, individual workers are involved in one or maximum two tasks, in which they have maximum qualification. Similarly, at a small company, if a machine needs to be used for several operations at the same time, it is often readjusted or tools are changed, which also leads to spending time and energy. The advantages of specialization also affect production management. The owner of a small company must be a multifunctional person in the management of that company. There he acts as the owner, manager, purchaser, seller, develops and implements the marketing policy, and is responsible for the working conditions, lawful book-keeping, the application of manufacturing standards, etc. On the contrary – at a large company, each of these activities or even their derivative activities, is performed by a narrowly specialized team or person, who is responsible for that and has high level of knowledge, expertise and qualification. In other words, micro and small enterprises are fundamentally more inefficient structures, as compared to large corporations. **Therefore, they cannot afford to operate in market niches with low added value, because they would not be able to survive a possibly low threshold**

level, such as the levels in the Pernik and Bobov Dol municipalities. This is the main reason why all goods, capable of being manufacture by large companies, to be accessible in the small central places through trade, but not local manufacturing. Future investments must take these into consideration these specificities and avoid such commercial conflicts.

The additional production economies, related to a larger-scale specialized manufacturing, are the result of what is known in regional science as *economies of large machinery*. This economy has two main aspects. First, the higher the investments in machinery and equipment, the more likely it is to preserve their operation for a longer period of time. In this way capital expenditures are distributed among a higher number of end-products and thus, their share drops per unit of production. This effect is non-existent at the micro and small enterprises.

In addition, some types of equipment have a certain minimum level of production capacity, below which it is better to stop its use, because this would result in additional costs. Second, the purchasing cost of many types of capital equipment, increase slower than the manufacturing capacity of such equipment.

All production units must be at a certain *level of stocks* of materials, equipment and spare parts, in order to meet a possible temporary shortage of regular supplies, machinery and equipment failures, etc. This is a particularly strong factor in a time of crisis, such as the current COVID-19 crises, when international transport and trade are affected.

Large companies are capable of negotiating all their supplies at preferential prices, since such economies accrue to the benefit of the suppliers themselves. Therefore, the low prices of supplies do not affect the rate of the added value of the suppliers, but merely eliminate some additional costs. It is important to note here, that this does not mean lower end-prices for the consumer or at least not always, but gives the large companies the chance to attack the market with dumping prices. Bulgaria has little traditions protecting its domestic market. The objective of these economies is not to ensure super-cheap products on the market, which would result in innumerable bankruptcies of the smaller competitive companies. The objective is to keep prices stable (low inflation), while the profit rates at such prices increases. This model of economies has another growth resource, which arises from the fact that the bigger volumes of production would increase the net cash flow. The improved delivery price levels at a relatively stable rate of return and stable inflation, will ensure good liquidity and yield of the enterprise.

For these and other reasons, the growth of a company and its production, are most likely to result in lower manufacturing costs per unit of products. However, this type of economies may only arise after reaching a certain industrial level of scale. **According to the applicable terminology, this is referred to as “minimum efficient scale” of production, where projects whatsoever should be implemented in Bobov Dol and Pernik, only if such scale can be reached by the new investments.** The reason for this is that below the level of this scale, the company would be less efficient, meaning that it would incur higher costs per unit of product – energy, labour, emissions. *Conditions, incompatible with the climate neutral or circular economy.*

PART V. ALTERNATIVE ECONOMIC ACTIVITIES

1. PRELIMINARY REQUIREMENTS AND CONDITIONS FOR THE ALTERNATIVE AND NEW ECONOMIC ACTIVITIES AND THE DEVELOPMENT OF THE REGION AFTER RESTRUCTURING THE COAL-MINING SECTOR



As a result of the localization analysis made above, the preliminary requirements and conditions, applicable to the alternative and new economic activities and the development of the region after restructuring the coal-mining sector, can be summarized as follows:

- Creating a **scheme of growth** through programming one or two economic activities, which play the role of economic “drivers”, i.e. adopting a phased approach for the fulfilment of the socio-economic objectives and tasks in order for them to be regionally and locally achievable;
- Application of the **focused support principle** – a rational selection of activities, projects, sectors, which would be strongly supported, provided that these would quickly enough generate revenues and new jobs which would benefit also those, who have not received any support;
- Redistribution of the manufacturing factors **in space** according to a project-based principle, first implementing the projects, which preserve the advantages of the region and transform its economy towards activities with sufficient jobs c higher added value, than the current situation;
- Determining the territories, with demographic and socio-economic indicators, from the perspective of the regional economy and social development, which are so severely impaired that it would be more realistic to limit the economy to organic farming, ecological and environmentally friendly activities, etc., defined as a special type of environmental areas and settlements – “eco geoparks”. The way of life would gradually result in the highest environmental standards, combined with new technologies.
- Establishing the **minimum threshold level and range** of the key businesses and services by settlements in order to define the localization and market potential of the alternative economic activities;
- Reaching the **minimum efficient scale of production** in order to minimize production costs and achieve compliance with the conditions, compatible with a climate neutral or circular economy.

The alternative and new economic activities, depending on their scale of investments and production capacity could be realized through various financing mechanisms, incl. combinations thereof:

- Financial Grants from the programmes, funded by the EU and other donors – for SMEs and large enterprises;

- Private investments, including foreign – for SMEs and large enterprises;
- Public-private partnerships – for large-scale projects;
- Financial instruments (debt, share and quasi-share investments), provided in Bulgaria chiefly by “Fund Management of Financial Instruments in Bulgaria” EAD, which plays the role of a Fund of funds, performing target allocation of public funds from European programmes and national co-financing through a specialized financing scheme – for SMEs and large enterprises.

2. CURRENT DEVELOPMENT OF THE BUSINESS IN THE REGION AND GOOD ECONOMIC PRACTICES

According to data from the “*Regional Profiles: indicators of development*”⁵⁶ for 2020 of the Institute for Market Economics the assessment of the economic development of the Kyustendil Region is as follows:

- In 2018 the GDP per capita in the Kyustendil Region marked the third highest annual growth in Bulgaria (16,2% with country average of 9,3%), but its level remains relatively low – BGN 9,3 thousand (vs BGN 15,6 thousand country average);
- In the last five years, economic activity in the Kyustendil Region has remained almost constant and its value in Bulgaria leaves it a development” relatively low level. In 2019 the economic activity reached 70,2% (vs 74,3% country average);
- Kyustendil Region is characterized by very poor investment activity. The number of enterprises in the region is close to the country average – 51 per 1000 people of the population vs 59 per 1000 people country average in 2018. The acquisition costs of the tangible fixed assets (1118 BGN per capita vs the country average of BGN 2750 per capita) and the direct foreign investments (EUR 361 per capita vs EUR 3560 per capita country average) increased at an exceptionally slow rate and in 2018 these ranked third lowest in Bulgaria. Low investments have impact on the level of the products, manufactured in the region – in 2018 it amounted to BGN 11,9 thousand per capita vs the country average of BGN 25,9 thousand per capita.



NSI’s data regarding the key indicators, characterizing business development in Bulgaria and the Kyustendil Region, are as follows:

56. <https://www.regionalprofiles.bg/bg/>

Key economic growth indicators			2007	2014	2019	% change 2019/2007
Country Total	Direct foreign investments in non-financial enterprises as of 31.12.	thousand EUR	15167125	21581580	25341513	67%
	Tangible fixed assets acquisition costs	thousand BGN	27446562	20123833	21873680	-20%
	Turnover	thousand BGN	180576931	235121539	316382065	75%
	Production output	thousand BGN	111050458	141783781	194336570	75%
	Added value by factorial costs	thousand BGN	33130103	43913202	70780834	114%
Kyustendil	Direct foreign investments in non-financial enterprises as of 31.12.	thousand EUR	15671	43524	43398	177%
	Tangible fixed assets acquisition costs	thousand BGN	149841	139008	124925	-17%
	Turnover	thousand BGN	1150746	1678667	1971997	71%
	Production output	thousand BGN	879020	1265127	1498260	70%
	Added value by factorial costs	thousand BGN	297394	346039	495133	66%

Source: nsi.bg



For the Pernik Region the economic development assessment is as follows:

- In 2018 GDP per capita in Pernik Region grew twice as fast as the country average (18,3% vs 9,3% country average), although it remained far below the average level – BGN 9,2 thousand vs BGN 15,6 thousand country average;
- In 2019 there was a serious boost on the labour market in the region. Economic activity marked a serious growth of 7 percentage points, reaching 79,1%, overtaking by a large margin the country average (74,3%);
- Investment activity in the region is relatively poor. Its proximity to the capital city has an impact on both the number of enterprises and the attracted investments. In 2018 a total of 45 companies operate per 1000 people of the population vs 59 per 1000 people country average. The acquisition costs of the tangible fixed assets, as well as the direct foreign investments are more than two times lower than the country average. This also explains the relatively low manufactured products – BGN 17,5 thousand per capita vs BGN 25,9 thousand per capita.

NSI's data regarding the key indicators, characterizing business development in Bulgaria and the Pernik Region, are as follows:

Key economic growth indicators			2007	2014	2019	% change 2019/2007
Country Total	Direct foreign investments in non-financial enterprises as of 31.12.	thousand EUR	15167125	21581580	25341513	67%
	Tangible fixed assets acquisition costs	thousand BGN	27446562	20123833	21873680	-20%
	Turnover	thousand BGN	180576931	235121539	316382065	75%
	Production output	thousand BGN	111050458	141783781	194336570	75%
	Added value by factorial costs	thousand BGN	33130103	43913202	70780834	114%
Pernik	Direct foreign investments in non-financial enterprises as of 31.12.	thousand EUR	232106	218999	186984	-19%
	Tangible fixed assets acquisition costs	thousand BGN	237041	126798	146411	-38%
	Turnover	thousand BGN	2147341	2019411	2869295	34%
	Production output	thousand BGN	1553886	1433169	2004335	29%
	Added value by factorial costs	thousand BGN	414510	319057	558976	35%

Source: nsi.bg

To sum up – the economic indicators, characterizing the development of business in both regions are among the most adverse in Bulgaria and having the lowest values in the Southwest tier 2 planning region.

When localizing alternative and new economic activities in order to overcome the negative trends as a result of restructuring the coal-mining sector, good practices, already implemented in other European countries (Greece, Denmark, Poland, the UK, Germany, the Netherlands, France) can prove beneficial. These can be summarized, as follows:

- **Primary sector** – growing high added value crops (e.g., aromatic and energy-producing plants, plants for extracting amino acids and other nutritional supplements), vegetables, fruits, other;
- **Secondary sector** – development of RES, energy saving, waste management, focusing on economic activities in the circular and climate neutral economy, support of “green” technologies, implementing innovations, reconversion of industrial terrains, supporting start-ups – reprocessing of materials, produced in agriculture, mainly through energy generation from RES;
- **Tertiary sector** – requalification and additional qualification of the economically active population in the so-called “green” professions, development of alternative forms of tourism based on local competitive advantages (incl. industrial and eco-tourism, attractions of modern and/or cultural type – ethnopark related to experiences and active attractions, where visitors are participants and not merely

audience), active involvement of the scientific and business circles in the development of R&D, information technologies, etc.

3. DEVELOPMENT SCENARIOS

The “Just transition for the coal-mining regions in Southwest Bulgaria” Report identifies three scenarios for restructuring the coal-mining sector and transition from coal to low- or zero-emissions economy:

- 1) **Scenario for preserving the status quo** or not doing anything;
- 2) **Scenario for a growth**, based on the domestic resources and advantages of the region;
- 3) **Scenario “creative upgrade”** with the involvement of external investors, based on the “Creative Destruction” concept.

Considering the need to limit the adverse effects of already occurring changes, as well as to prevent the worst-case scenario, the localization of new and alternative economic activities should focus on the implementation of the second, and if possible – the third scenario, detailed, as follows:

Economic activities by priority directions	Scenario 2 Growth, based on the domestic resources and advantages of the region	Scenario 3 “Creative Destruction” with the involvement of external investors
INNOVATIONS AND COMPETITIVENESS	<ul style="list-style-type: none"> ■ Phasing out of coal mining in the region and reconversion of the industrial terrains ■ Phased transition to electricity generation from RES and restructuring of the TPSs for energy generation from RDF and hydrogen ■ Development of agriculture, forestry and processing industry, based on the competitive advantages of the region ■ Development of tourism through sustainable use of the natural environment and CHH in the region, incl. alternative forms of tourism (industrial and eco-tourism, modern attractions, etc.) 	<ul style="list-style-type: none"> ■ Simultaneous phasing out of coal mining in the region in the short term and transition to electricity generation from RES, incl. reconversion of the industrial terrains and restructuring of the TPSs for energy generation from RDF and hydrogen ■ Development and implementation of a business strategy for the management of trade in the best interests of local manufacturers focusing on incentivizing export at the expense of import and economic activities with high added value ■ Increasing the direct foreign investments by transnational corporations ■ Stimulating certain economic activities through the so-called industrial strategy focusing on “green” technologies and circular economy

Economic activities by priority directions	Scenario 2 Growth, based on the domestic resources and advantages of the region	Scenario 3 “Creative Destruction” with the involvement of external investors
<p>IMPROVEMENT OF THE QUALIFICATION AND INCOME OF THE WORKFORCE</p>	<ul style="list-style-type: none"> ■ Early retirement of a part of those, employed in the coal-mining industry ■ Requalification of the economically active population, made redundant from the manufacturing sector, related to the coal mining and burning in the following areas: RES, agriculture, forestry, processing industry, tourism ■ Providing reliefs to entrepreneurs, e.g., provision of free office spaces in renovated buildings for indoor production activities, tax reliefs for a period of 2 to 5 years, etc. ■ Provision of social benefits for young families, e.g., payment of an additional one-time benefit for childbirth, amounting to at least BGN 10 000, subject to expressed commitment for residence in the region for a period of 5 years, subsidizing out-of-school activities for pre-school and school children, etc. ■ Involving the local population in the policies and the activities of the local administration for the development of settlements – through regular local referendums, public discussions of investment projects of local nature, etc. 	<ul style="list-style-type: none"> ■ Viewing human resources as a production factor with highly specialized working skills, related to highly intellectual labour and creativity – mandatory, prior to the implementation of new products or services ■ Requalification and additional qualification of the economically active population in the so-called “green” professions ■ Providing tax reliefs to investors in the target territory for attracting and training highly-qualified personnel ■ Provision of basic services to the population, such as housing opportunities, transport, healthcare, security and protection, incl. provision of social benefits for young families (e.g., payment of an additional one-time benefit for childbirth, amounting to at least BGN 10 000, subject to expressed commitment for residence in the region for a period of 5 years, subsidizing out-of-school activities for pre-school and school children, etc.) ■ Encouraging a flexible labour market through a deregulation process and transition to a welfare regimen, where the unemployed population must work to receive social benefits ■ Boosting the role of the civil society as the intermediary between the state and the local population and a regulator of the business environment ■ “Importing” workforce for the performance of high-tech economic activities

Economic activities by priority directions	Scenario 2 Growth, based on the domestic resources and advantages of the region	Scenario 3 “Creative Destruction” with the involvement of external investors
DECARBONIZATION AND ENVIRONMENTAL PROTECTION	<ul style="list-style-type: none"> ■ Recultivation of the terrains after phasing out the coal mining and burning operations, incl. with the involvement of their current users ■ Establishment of partnership between the administration, scientific circles, business and the non-governmental sector for optimal use of the land and buildings of the coal mining and burning operations after these are phased out ■ Encouraging circular economy, focusing on policies for sustainable products and prevention of the pollution from various household and industrial sources 	<ul style="list-style-type: none"> ■ Development of circular economy, incl. through prioritized implementation of eco and resource innovations ■ Recultivation of the terrains after phasing out the coal mining and burning operations, incl. with the involvement of their current users ■ Establishment of partnership between the administration, scientific circles, business and the non-governmental sector for optimal use of the land and buildings of the coal mining and burning operations after these are phased out ■ In the long term – transition to circular economy, sustainable products and elimination of pollution from various household and industrial sources

4. COMPARATIVE EVALUATION OF THE DEVELOPMENT SCENARIOS

The three scenarios provide different capacity for regional economy activation. The comparison may be based on three indicators:

- Number of newly created jobs
- GDP Growth in %
- Amount of the investments required
 - Combination of the above, without a proportional dependence

Scenario 1 is the current development of the region and the trends of the recent decades. It results in the realization of all possible negative processes – economic, demographic and social. As indicated in the Just transition report, this scenario is not recommended and this position remains in effect.

Scenario 2 is the most feasible, since it is based on the economic, social, natural, technological and the demographic resources of Bulgaria, but supported by EU financing. This scenario, preserves the job predictions, while transforming the jobs to more highly productive and efficient. With it, the financing through RDP, Priority 3

“Just Energy Transition” of the “Regions in Transition” Programme and the other financial instruments of the “Green Deal” will become reasonable to implement. This scenario must change the direction of commutes from other settlements towards the Pernik and Bobov Dol municipalities and apart from a location of jobs, make them a desirable living location. The amount of the investments is all the funding, according to the said instruments plus Bulgaria’s financial and intellectual capacity.

Scenario 2 is the natural entry towards scenario 3, where the improved economic, social and demographic environment would be capable of exercising an “attractive” effect for a significant corporation, which would complement the region with its investments and solutions. Direct implementation of scenario 3 is both unlikely and a step, characterized by high risk. Public structures in these regions are still weak – the NHO sector, administration’s capacity, etc. Therefore, to the name of “immediate” jobs, too many compromises may be made, which are in fact the consequences of the coal industry. This scenario includes the increase in the number of the population in the target territory.

The combination of the three indicators above is also probable. For example, in the beginning of the implementation of the focused policies and financial instruments, the number of the jobs would not increase, and it is even possible to decrease. According to this indicator the development will resemble scenario 1, but if the jobs are green, more productive and in new sub-sectors, this would be comparable to scenario 2. This process may continue for a long time and if commutes do not change their direction, there will be a constant number of jobs, increasing efficiency, economic stabilization, but preservation of the demographic and social situation. In this respect, the implementation of the scenarios “in their pure form” seems unlikely, and rather a combination of individual cases of relocation, new activities and gradual change is much more probable.

5. PROVISIONS OF THE PROGRAMME “REGIONS IN TRANSITION” 2021-2027, PRIORITY 3 “JUST ENERGY TRANSITION”

Most of the activities that can successfully be implemented on the territory of the Bobov Dol, Pernik and Stara Zagora municipalities will in fact fall within the scope of several project groups, which would correspond to the eligible activities of *Priority 3 “Just Energy Transition” of “Regions in Transition” Programme 2021-2027.*

Financing from the JTF, with a budget of EUR 1 584 855 462;

Scope: at regions level, as currently this includes regions Pernik, Kyustendil and Stara Zagora. Negotiations are under way to include 8 further regions, identified as strongly affected by the energy transition – Sliven, Yambol, Haskovo, Burgas, Varna, Lovech, Gabrovo, Targovishte;

Indicative support measures: these will be determined by the identified needs in the Territorial just transition plans, which are being developed. The expectations are that the Plans, subject to approval by the EC, will be completed in the 2nd part of this year.

In the left column “*Necessity of integration with the localization conclusions and recommendations*” are the eligible activities, which must be taken into consideration and the conclusions of the localization analysis.

Eligible activities:

Necessity of integration with the localization conclusions and recommendations	Without the necessity of integration with the localization conclusions and recommendations (ubiquitous spatial nature)
<ul style="list-style-type: none"> ■ Productive investments in SMEs, including micro-companies and start-ups, producing economic diversification, modernization and reconversion <p>Comment: <i>This is the group of activities which is highly dependent on the localization analyses and recommendations. Its efficiency is of strong market nature and must conform to the logic of market areas, access to resources, workforce and technologies.</i></p> <p>Major contribution to the just energy transition.</p>	<ul style="list-style-type: none"> ■ Investments in smart and sustainable local mobility, including decarbonization of the local transport sector and its infrastructure <p>Comment: <i>Substitution frame of the projects for integrated urban transport implemented in previous programming periods.</i></p> <p>Poor contribution to the just energy transition.</p>
<ul style="list-style-type: none"> ■ Investments in the establishment of new companies, including through business incubators and consulting services, leading to job creation <p>Comment: <i>High level of dependence on the localization analysis. Similarity to schemes from programming period 2007-2013. Risk of transforming them into projects for renting office space. Need of locating the incubators in central places with unutilized market potential.</i></p> <p>Poor contribution to the just energy transition.</p>	<ul style="list-style-type: none"> ■ Investments in digitalization, digital innovations and digital connectivity <p>Comment: <i>Poor dependence on the localization analysis. Connection to businesses in the IT sector, sufficiently</i></p> <p>Poor contribution to the just energy transition.</p>
<ul style="list-style-type: none"> ■ R&D and innovation activities, including at universities and public research institutions, and encouraging the transfer of modern technologies <p>Comment: <i>Need of localization analysis of a partnering business of scientific organizations. Need of analysis of the market potential on the specific territory, technology and product.</i></p> <p>Major contribution to the just energy transition.</p>	<ul style="list-style-type: none"> ■ Improving the qualification and requalification of workers and job-seekers; <p>Comment: <i>Valid for all economic activities and all employees. Extremely important social focus.</i></p> <p>Poor contribution to the just energy transition.</p>

Necessity of integration with the localization conclusions and recommendations	Without the necessity of integration with the localization conclusions and recommendations (ubiquitous spatial nature)
<ul style="list-style-type: none"> ■ Implementation of technologies, as well as systems and infrastructures for accessible clean energy, including energy storage technologies, and reduction of greenhouse gas emissions <p>Comment: <i>It is not clear how clean energy would be accessible and where would these technologies be implemented. Overlapping with the previous group of activities.</i></p> <p>Poor contribution to the just energy transition.</p>	<ul style="list-style-type: none"> ■ Support in finding jobs, support for active aging and support for the income of workers in transition between jobs <p>Comment: <i>Valid for all economic activities and all employees. Extremely important social focus.</i></p> <p>Poor contribution to the just energy transition.</p>
<ul style="list-style-type: none"> ■ Investments in regeneration and decontamination of abandoned terrains, recultivation of land and including, where necessary, green infrastructure and readjustment projects, taking into consideration the “polluter pays” principle <p>Comment: <i>Most probably this is a reference to terrains after discontinuation of coal mining, which can be considered disturbed sites and are subject to recultivation. High environmental significance. In this group of activities “it is expected coal-mining pollutants to be identified in the future” after phasing out the coal mining and abandoning the of the terrains.</i></p> <p>Major contribution to the just energy transition.</p>	<ul style="list-style-type: none"> ■ Active involvement of job-seekers, particularly women, people with disabilities and vulnerable groups <p>Comment: <i>Valid for all economic activities and all employees. Extremely important social focus.</i></p> <p>Poor contribution to the just energy transition.</p>
	<ul style="list-style-type: none"> ■ Other activities in the area of education and social inclusion, where duly justified, infrastructure for the purposes of the training centres, childcare and elderly people establishment, as indicated in the territorial transition plans, etc. <p>Comment: <i>Social measures of general nature, which are ubiquitous and create social employment and social services for the entire population.</i></p> <p>Poor contribution to the just energy transition.</p>
	<ul style="list-style-type: none"> ■ Rehabilitation and modernization of the district heating networks in order to improve the energy efficiency of the central heating systems and investments in thermal energy generation, subject to delivery entirely from renewable energy sources.

Necessity of integration with the localization conclusions and recommendations	Without the necessity of integration with the localization conclusions and recommendations (ubiquitous spatial nature)
	<p>Comment: <i>The rehabilitation of these grids must be performed on exclusively market principle. The number of district heating TPSs is not equal to the number of regional cities, included in the scope of the priority. All other conditions being equal, this activity creates inequality. If the projects are financially profitable, these should be credited by commercial banks or financial instruments, and not funded through FG.</i></p> <p>Major contribution to the just energy transition.</p> <ul style="list-style-type: none"> ■ Investments in renewable energy in accordance with the Directive (EC) 2018/20016 on Renewable Energy Sources, including the sustainability criteria, specified therein, and in energy efficiency, including for the purposes of reducing of the energy poverty <p>Comment: <i>Ubiquitous activities, which must be market-oriented, with real added value and are financially profitable for the investor. It is not necessary to provide funding through FGs.</i></p> <p>Major contribution to the just energy transition.</p> <ul style="list-style-type: none"> ■ Improvement of the circular economy through waste prevention, reduction, efficient use of the resources, reuse, repair and recycling. <p>Комментар: <i>Ubiquitous environmental principles and measures.</i></p> <p>Poor contribution to the just energy transition.</p>

6. PROVISIONS IN THE RECOVERY AND SUSTAINABILITY PLAN OF THE REPUBLIC OF BULGARIA, VERSION 1.1. OF FEBRUARY 2021

Pillar 2. B. GREEN BULGARIA

Component 2.B.1. Low-carbon economy

Regional policy: energy, energy efficiency, social policy.

Objective: The main objective of this component is to reduce carbon footprint and the energy intensity of the economy and supporting the green transition through undertaking measures for improving energy efficiency of residential, industrial and public building, as well as through the encouragement of energy generation from renewable sources. It would be of key importance to modernize the activities, related to the planning, management and maintenance of the Bulgarian electricity transmission grid, as well as to complete the continuing reform of the electricity market, to ensure full liberalization.

Cost estimation: The indicative cost estimations, required for the achieving the objectives of the component, amount to a total of BGN 3 604.3 mln., of which BGN 3 377 mln. would be at the expense of the Recovery and Sustainability Mechanism and BGN 227.3 mln. national co-financing.

Reforms and/or investments:

Necessity of integration with the localization conclusions and recommendations	Without the necessity of integration with the localization conclusions and recommendations (<i>ubiquitous spatial nature</i>)
<ul style="list-style-type: none"> ■ Supporting the producers of energy from renewable sources. Development, facilitation and acceleration of international trade with guarantees of origin. <p>Comment: <i>This is the group of activities which is highly dependent on the localization analyses and recommendations. Its efficiency is of strong market nature and must conform to the logic of market areas, access to resources, workforce and technologies.</i></p> <p><i>Introducing restrictive requirements for “trading with guarantees of origin” works against the one introducing them.</i></p> <p>Major contribution to the just energy transition.</p>	<ul style="list-style-type: none"> ■ Creating a National decarbonization fund <p>Comment: <i>A national project of high public significance.</i></p> <p>Major contribution to the just energy transition.</p>

Necessity of integration with the localization conclusions and recommendations	Without the necessity of integration with the localization conclusions and recommendations (<i>ubiquitous spatial nature</i>)
<ul style="list-style-type: none"> ■ Design, construction and commissioning of infrastructure for the transmission of hydrogen and low-carbon gaseous fuels for feeding power stations and other consumers in the coal-mining regions of the Republic of Bulgaria. <p>Comment: <i>There is no evaluation of the degree of readiness of the technologies for hydrogen transmission, the technical standards and safety measures. There are no feasibility studies and cost-benefit analyses of whether or not this type of technologies are in fact applicable in Bulgaria, what timeframes and investments they would require.</i></p> <p><i>The technology is not of Bulgarian origin and the country has no technological knowledge and control of it. We do not have a Bulgarian company, with a specialized workforce pool, either.</i></p> <p>Major contribution to the just energy transition.</p>	<ul style="list-style-type: none"> ■ The development of definition of “energy poverty” for the households in the Energy Efficiency Act for the purposes of financing energy efficiency projects <p>Comment: <i>The wording refers to the work of the relevant ministries and the National Assembly, the activities of which are supported by the Bulgarian state budget.</i></p> <p>Poor contribution to the just energy transition.</p>
<ul style="list-style-type: none"> ■ Scheme for supporting pilot projects for manufacturing of green hydrogen and biogas <p>Comment: <i>There is no evaluation of the degree of readiness of the technologies for producing green hydrogen and biogas, the technical standards and safety measures.</i></p> <p><i>There are no feasibility studies and cost-benefit analyses of whether or not this type of technologies are in fact applicable in Bulgaria, what timeframes and investments they would require.</i></p> <p>Major contribution to the just energy transition.</p>	<ul style="list-style-type: none"> ■ Energy efficiency of buildings <p>Comment: <i>The energy efficiency of buildings is a significant public issue, but it is indirectly related to the nature of the Just Energy Transition concept.</i></p> <p><i>The effect of this type of projects is limited to a specific type of buildings. It causes inequality between the owners of the different types of properties, and there are no thorough analyses of the achieved energy efficiency improvement, as compared to the amount of the investments.</i></p> <p><i>It is unclear what is the structural lifetime of these buildings, how long would they be able to perform their functions. This impairs the sustainability of the investments, particularly for concrete panel buildings.</i></p> <p>Satisfactory contribution to the just energy transition.</p> <ul style="list-style-type: none"> ■ Programme for financing individual energy efficiency measures in single-family houses and multi-family buildings, which are not connected to heat-transmission and gas-transmission grids. <p>Comment: <i>The energy efficiency of buildings is a significant public issue, but it is indirectly related to the nature of the Just Energy Transition concept.</i></p> <p>Satisfactory contribution to the just energy transition.</p>

Necessity of integration with the localization conclusions and recommendations	Without the necessity of integration with the localization conclusions and recommendations (<i>ubiquitous spatial nature</i>)
	<ul style="list-style-type: none"> ■ Energy efficient municipal systems for artificial outdoor lighting; <p>Comment: <i>This is an individual out-of-pocket issue of each separate settlement. The just energy transition funding cannot be used to solve municipalities' individual problems of household nature.</i></p> <p>Satisfactory contribution to the just energy transition.</p> <ul style="list-style-type: none"> ■ Mechanism for financing energy efficiency projects and renewable sources, through the energy bills <p>Comment: <i>A Consulting service, which does not require inclusion in such a high-level document.</i></p> <p>Satisfactory contribution to the just energy transition.</p> <ul style="list-style-type: none"> ■ One-desk service <p>Comment: <i>Consulting service, which does not require inclusion in such a high-level document.</i></p> <p>Poor contribution to the just energy transition.</p> <ul style="list-style-type: none"> ■ Digital transformation and development of the information systems and real-time systems of the Electricity System Operator in a low-carbon economy environment <p>Comment: <i>Consulting/technical service, which does not require inclusion in such a high-level document. The Electricity System Operator is capable of organizing alone its digital transformation and the development of its information systems.</i></p> <p>Poor contribution to the just energy transition.</p> <ul style="list-style-type: none"> ■ Preparation and adoption of a National Roadmap for the improvement of the conditions for enhancement of the potential for development of hydrogen technologies and the mechanisms for the production and supply of hydrogen. <p>Comment: <i>Consulting/technical support/service, which does not require inclusion in such a high-level document.</i></p> <p>Satisfactory contribution to the just energy transition.</p>

The activities and investments, proposed in the two national documents, do not correspond directly to the Just Energy Transition concept. The “watering can principle” has been programmed – a little money everywhere, which will not ensure efficiency and effectiveness. Some of the proposed activities in the “Regions in Transition” Programme resemble non-implemented priorities from the previous programming periods, without any clear connection to the current needs. This approach does not result in reduction of the disparities on the territory of the Republic of Bulgaria and do not adequately address the regions, affected by energy transition.

7. RECOMMENDED PROVISIONS OF THE REPORT ON THE SITUATION – LOCALIZATION ANALYSIS FOR CREATING ALTERNATIVE ECONOMIC ACTIVITIES AND JOBS ON THE TERRITORY OF THE BOBOV DOL AND PERNIK MUNICIPALITIES

Bulgaria is significantly lagging behind in the preparation for the Green transition of its economy. Drastic systemic reforms are required, placing in the centre the innovative capital in Bulgaria, large-scale investments in education and knowledge, structural changes and new objectives and standards for reducing the carbon footprint. It is necessary to mobilize the entire expert capacity to define them, as well as wide public support for their implementation, in order to change the trends and Bulgaria’s image in Europe.

General framework of proposed actions for reforms:

- Analysis of the trends for technological and regenerative development with the involvement of the innovative community – business and academic;
- Defining the regions, where Bulgaria has well-developed technological capacity. Outlining specific measures for prioritized support of innovative companies, developing technologically-avantgarde and green products and solutions in these key directions;
- Establishment of a programme for widespread promotion and measures for the application of the principle of “zero-waste” lifestyle, carbon neutrality and regenerative economy in people’s everyday lives.

Proposals for support and implementation of short-term interventions and projects

Strong support for new investment measures for the transition to climate neutral economy and for the fulfilment of innovations for development of green economy under the following conditions:

1. Regulatory extension of the definitions of the Corporate Income Taxation Act in additional tax preferences to incentivize business in the Bobov Dol and Pernik Municipalities, as well as the Galabovo and Radnevo municipalities in Stara Zagora region.
2. No conditions for the presence of a patent when preparing and implementing projects.

Examples of project directions:

2.1. Projects for the application of technologies in green energy, green tourism, organic farming, resource efficiency and waste management, entire company-focused:

a. Green energy

- i. Projects for solar energy utilization
 1. Electricity – photovoltaics
 2. Heating – greenhouses, water facilities (swimming-pools), buildings

b. Green tourism and organic farming

- i. Projects for the development of tourist supply
 1. Development of eco-villages for accommodation, incl. guest houses.
 2. Construction of a coal mining museum at industrial locations – galleries, reconverted buildings, etc.
 3. Projects for tourist attractions and intangible heritage
- ii. Organic farming projects
 1. Development of organic farms
 2. Food-and-drinks companies, based on local foods

c. Resource efficiency (resource basis – agriculture, animal production, forestry, mineral resources, recycled materials, etc.)

- i. Bio-based resource efficiency projects
 1. Wood-based bioplastics
 2. Biogas – based on wood and biomass from agriculture and animal production
 3. Biomaterials – other

d. Waste management and utilization

- i. Recycling and application of polymer and rubber waste
- ii. Recycling of textile waste
- iii. Recycling of biological waste
- iv. Recycling and utilization of other decommissioned sources of resources, such as motor vehicles, industrial technologies, photovoltaic systems

2.2. Projects for remedying the consequences of coal mining and meeting the environmental standards:

- a. Recultivation and utilization of disturbed sites after coal mining**
 - i. Recultivation of disturbed sites
 - ii. Construction of photovoltaics, industrial areas, entertainment parks and other applications
- b. Utilization and industrial reconversion of buildings and structures after coal mining and energy generation, using that coal**
 - i. Converting buildings for other purposes
 - ii. Removing dangerous and polluted buildings

2.3. Social and training projects for mitigation of the consequences of the transition to climate neutral economy:

- a. Social projects for persons, directly employed in coal mining and electricity from the extracted coal**
 - i. Early retirement
 - ii. Training and requalification for finding new jobs
 - iii. Joining projects for establishing a micro-enterprise
- b. Social projects for persons, affected from the transition to climate neutral economy**
 - i. Early retirement
 - ii. Training and requalification for finding new jobs
 - iii. Joining projects for establishing a micro-enterprise

8. ANALYSIS OF THE COMPETITIVE ADVANTAGES OF THE REGION

Based on the competitive advantages of the Southwest Region, identified in the “Just transition for the coal-mining regions in Southwest Bulgaria” Report, the interrelation was established between the competitive advantages and their application, and the proposed project directions, project groups and economic sectors as per EAQ – 2008.

Category	Competitive advantages	Application		
		Project direction	Project Groups	Sectors as per EAQ-2008
Manufacturing factors	Natural resources – mineral resources, resources for electricity generation from RES, CHH, conserved natural environment, forests, abundant water resources	Technologies in green energy, green tourism, organic farming, resource efficiency and waste management	<ul style="list-style-type: none"> • Green energy • Green tourism and organic farming • Resource efficiency (resource basis – agriculture, animal production, forestry, mineral resources, recycled materials, etc.) 	<ul style="list-style-type: none"> • A: Agriculture, Forestry and Fishing • C: Processing industry • D: Electricity, Thermal Energy and Gaseous Fuels Generation, Production and Distribution • I: Accommodation and food service activities • R: Culture, sports and entertainment
	Human resources – presence of economically active population with university degrees in the larger cities	Technologies in green energy, green tourism, organic farming, resource efficiency and waste management	<ul style="list-style-type: none"> • Green tourism and organic farming 	<ul style="list-style-type: none"> • A: Agriculture, Forestry and Fishing • I: Accommodation and food service activities • R: Culture, sports and entertainment
		Social and training projects for mitigation of the consequences of the transition to climate neutral economy	<ul style="list-style-type: none"> • Social projects for persons, directly employed in coal mining and electricity from the extracted coal • Social projects for persons, affected from the transition to climate neutral economy 	<ul style="list-style-type: none"> • A: Agriculture, Forestry and Fishing • C: Processing industry • D: Electricity, Thermal Energy and Gaseous Fuels Generation, Production and Distribution • P: Education
	Financial resources – capacity for attracting DFI	Technologies in green energy, green tourism, organic farming, resource efficiency and waste management	<ul style="list-style-type: none"> • Green energy • Resource efficiency (resource basis – agriculture, animal production, forestry, mineral resources, recycled materials, etc.) 	<ul style="list-style-type: none"> • C: Processing industry • D: Electricity, Thermal Energy and Gaseous Fuels Generation, Production and Distribution
		Projects for remedying the consequences of coal mining and meeting the environmental standards	<ul style="list-style-type: none"> • Recultivation and utilization of disturbed sites after coal mining • Utilization and industrial reconversion of buildings and structures after coal mining and energy generation, using that coal 	<ul style="list-style-type: none"> • B: Extractive industry • C: Processing industry • F: Civil engineering • G: Wholesale and retail trade; repair of motor vehicles and motorcycles • H: Transporting, Storage and Posts • J: Creation and distribution of information and creative products, Telecommunications • L: Real estate activities • M: Professional, scientific and technical activities • Q: Human healthcare and social work • R: Culture, sports and entertainment

Physical infrastructure – relatively well-developed engineering infrastructure	Technologies in green energy, green tourism, organic farming, resource efficiency and waste management	<ul style="list-style-type: none"> • Green energy • Resource efficiency (resource basis – agriculture, animal production, forestry, mineral resources, recycled materials, etc.) • Waste management and utilization 	<ul style="list-style-type: none"> • C: Processing industry • D: Electricity, Thermal Energy and Gaseous Fuels Generation, Production and Distribution • E: Water supply, sewerage services, waste management and remediation activities
	Projects for remedying the consequences of coal mining and meeting the environmental standards	<ul style="list-style-type: none"> • Recultivation and utilization of disturbed sites after coal mining • Utilization and industrial reconversion of buildings and structures after coal mining and energy generation, using that coal 	<ul style="list-style-type: none"> • C: Processing industry • F: Civil engineering • G: Wholesale and retail trade; repair of motor vehicles and motorcycles • H: Transporting, Storage and Posts • J: Creation and distribution of information and creative products, Telecommunications • L: Real estate activities • M: Professional, scientific and technical activities
Administrative infrastructure – relatively well-developed tertiary sector	Technologies in green energy, green tourism, organic farming, resource efficiency and waste management	<ul style="list-style-type: none"> • Green tourism and organic farming 	<ul style="list-style-type: none"> • I: Accommodation and food service activities • R: Culture, sports and entertainment
	Social and training projects for mitigation of the consequences of the transition to climate neutral economy	<ul style="list-style-type: none"> • Social projects for persons, directly employed in coal mining and electricity from the extracted coal • Social projects for persons, affected from the transition to climate neutral economy 	<ul style="list-style-type: none"> • I: Accommodation and food service activities • J: Creation and distribution of information and creative products, Telecommunications • M: Professional, scientific and technical activities • N: Administrative and auxiliary activities • P: Education • Q: Human healthcare and social work • R: Culture, sports and entertainment
Information infrastructure – high availability	Technologies in green energy, green tourism, organic farming, resource efficiency and waste management	<ul style="list-style-type: none"> • Green energy • Green tourism and organic farming • Resource efficiency (resource basis – agriculture, animal production, forestry, mineral resources, recycled materials, etc.) • Waste management and utilization 	<ul style="list-style-type: none"> • A: Agriculture, Forestry and Fishing • C: Processing industry • D: Electricity, Thermal Energy and Gaseous Fuels Generation, Production and Distribution • E: Water supply, sewerage services, waste management and remediation activities • I: Accommodation and food service activities • R: Culture, sports and entertainment

<p>Scientific and technological infrastructure – in close proximity in the capital city, as well as universities, existing in the region</p>	<p>Projects for remedying the consequences of coal mining and meeting the environmental standards</p>	<ul style="list-style-type: none"> • Recultivation and utilization of disturbed sites after coal mining • Utilization and industrial reconversion of buildings and structures after coal mining and energy generation, using that coal 	<ul style="list-style-type: none"> • B: Extractive industry • C: Processing industry • F: Civil engineering • G: Wholesale and retail trade; repair of motor vehicles and motorcycles • H: Transporting, Storage and Posts • J: Creation and distribution of information and creative products, Telecommunications • L: Real estate activities • M: Professional, scientific and technical activities • Q: Human healthcare and social work • R: Culture, sports and entertainment
	<p>Social and training projects for mitigation of the consequences of the transition to climate neutral economy</p>	<ul style="list-style-type: none"> • Social projects for persons, directly employed in coal mining and electricity from the extracted coal • Social projects for persons, affected from the transition to climate neutral economy 	<ul style="list-style-type: none"> • A: Agriculture, Forestry and Fishing • C: Processing industry • D: Electricity, Thermal Energy and Gaseous Fuels Generation, Production and Distribution • I: Accommodation and food service activities • J: Creation and distribution of information and creative products, Telecommunications • M: Professional, scientific and technical activities • N: Administrative and auxiliary activities • P: Education • Q: Human healthcare and social work • R: Culture, sports and entertainment
	<p>Technologies in green energy, green tourism, organic farming, resource efficiency and waste management</p>	<ul style="list-style-type: none"> • Resource efficiency (resource basis – agriculture, animal production, forestry, mineral resources, recycled materials, etc.) • Waste management and utilization 	<ul style="list-style-type: none"> • C: Processing industry • D: Electricity, Thermal Energy and Gaseous Fuels Generation, Production and Distribution • E: Water supply, sewerage services, waste management and remediation activities
	<p>Projects for remedying the consequences of coal mining and meeting the environmental standards</p>	<ul style="list-style-type: none"> • Recultivation and utilization of disturbed sites after coal mining • Utilization and industrial reconversion of buildings and structures after coal mining and energy generation, using that coal 	<ul style="list-style-type: none"> • C: Processing industry • J: Creation and distribution of information and creative products, Telecommunications • M: Professional, scientific and technical activities • P: Education

Demand conditions	Increasing income and quality of life through the utilization of specific products and new market niches	Technologies in green energy, green tourism, organic farming, resource efficiency and waste management	<ul style="list-style-type: none"> • Green energy • Green tourism and organic farming • Resource efficiency (resource basis – agriculture, animal production, forestry, mineral resources, recycled materials, etc.) Waste management and utilization	<ul style="list-style-type: none"> • A: Agriculture, Forestry and Fishing • C: Processing industry • D: Electricity, Thermal Energy and Gaseous Fuels Generation, Production and Distribution • E: Water supply, sewerage services, waste management and remediation activities • I: Accommodation and food service activities • R: Culture, sports and entertainment
		Projects for remedying the consequences of coal mining and meeting the environmental standards	<ul style="list-style-type: none"> • Recultivation and utilization of disturbed sites after coal mining • Utilization and industrial reconversion of buildings and structures after coal mining and energy generation, using that coal 	<ul style="list-style-type: none"> • C: Processing industry • F: Civil engineering • G: Wholesale and retail trade; repair of motor vehicles and motorcycles • H: Transporting, Storage and Posts • J: Creation and distribution of information and creative products, Telecommunications • L: Real estate activities • Q: Human healthcare and social work • R: Culture, sports and entertainment
		Social and training projects for mitigation of the consequences of the transition to climate neutral economy	<ul style="list-style-type: none"> • Social projects for persons, directly employed in coal mining and electricity from the extracted coal • Social projects for persons, affected from the transition to climate neutral economy 	<ul style="list-style-type: none"> • A: Agriculture, Forestry and Fishing • C: Processing industry • D: Electricity, Thermal Energy and Gaseous Fuels Generation, Production and Distribution • I: Accommodation and food service activities • J: Creation and distribution of information and creative products, Telecommunications • Q: Human healthcare and social work • R: Culture, sports and entertainment
		Creating unusual local demand in specialized segments – e.g., electricity generation and utilization from RES in the ICT sector, outsourcing ICT activities of the TNC, etc., alternative agriculture and tourism	Technologies in green energy, green tourism, organic farming, resource efficiency and waste management	<ul style="list-style-type: none"> • Green energy • Green tourism and organic farming • Resource efficiency (resource basis – agriculture, animal production, forestry, mineral resources, recycled materials, etc.) • Waste management and utilization

<p>Corporate strategy and competition</p>	<p>Meeting the needs of goods and services, which will support the newly created main and auxiliary/services</p>	<p>Projects for remedying the consequences of coal mining and meeting the environmental standards</p>	<ul style="list-style-type: none"> • Recultivation and utilization of disturbed sites after coal mining • Utilization and industrial reconversion of buildings and structures after coal mining and energy generation, using that coal 	<ul style="list-style-type: none"> • C: Processing industry • H: Transporting, Storage and Posts • J: Creation and distribution of information and creative products, Telecommunications • Q: Human healthcare and social work • R: Culture, sports and entertainment
	<p>Technologies in green energy, green tourism, organic farming, resource efficiency and waste management</p>	<ul style="list-style-type: none"> • Green energy • Green tourism and organic farming • Resource efficiency (resource basis – agriculture, animal production, forestry, mineral resources, recycled materials, etc.) • Waste management and utilization 	<ul style="list-style-type: none"> • A: Agriculture, Forestry and Fishing • C: Processing industry • D: Electricity, Thermal Energy and Gaseous Fuels Generation, Production and Distribution • E: Water supply, sewerage services, waste management and remediation activities • I: Accommodation and food service activities • R: Culture, sports and entertainment 	
	<p>Social and training projects for mitigation of the consequences of the transition to climate neutral economy</p>	<ul style="list-style-type: none"> • Social projects for persons, directly employed in coal mining and electricity from the extracted coal • Social projects for persons, affected from the transition to climate neutral economy 	<ul style="list-style-type: none"> • A: Agriculture, Forestry and Fishing • C: Processing industry • D: Electricity, Thermal Energy and Gaseous Fuels Generation, Production and Distribution • I: Accommodation and food service activities • J: Creation and distribution of information and creative products, Telecommunications • M: Professional, scientific and technical activities • N: Administrative and auxiliary activities • P: Education • Q: Human healthcare and social work • R: Culture, sports and entertainment 	
	<p>Technologies in green energy, green tourism, organic farming, resource efficiency and waste management</p>	<ul style="list-style-type: none"> • Green energy • Green tourism and organic farming • Resource efficiency (resource basis – agriculture, animal production, forestry, mineral resources, recycled materials, etc.) • Waste management and utilization 	<ul style="list-style-type: none"> • A: Agriculture, Forestry and Fishing • C: Processing industry • D: Electricity, Thermal Energy and Gaseous Fuels Generation, Production and Distribution • E: Water supply, sewerage services, waste management and remediation activities • I: Accommodation and food service activities • R: Culture, sports and entertainment 	
<p>The favourable geographic situation of the region (with three national borders and intersection of 3 European Transport Corridors (ETC) – 4, 8 and 10)</p>				

Related and supporting manufacture	The close proximity of and easy access to the capital city Sofia	Projects for remedying the consequences of coal mining and meeting the environmental standards	<ul style="list-style-type: none"> • Recultivation and utilization of disturbed sites after coal mining • Utilization and industrial reconversion of buildings and structures after coal mining and energy generation, using that coal 	<ul style="list-style-type: none"> • C: Processing industry • H: Transporting, Storage and Posts • J: Creation and distribution of information and creative products, Telecommunications • Q: Human healthcare and social work • R: Culture, sports and entertainment
		Technologies in green energy, green tourism, organic farming, resource efficiency and waste management	<ul style="list-style-type: none"> • Green energy • Green tourism and organic farming • Resource efficiency (resource basis – agriculture, animal production, forestry, mineral resources, recycled materials, etc.) • Waste management and utilization 	<ul style="list-style-type: none"> • A: Agriculture, Forestry and Fishing • C: Processing industry • D: Electricity, Thermal Energy and Gaseous Fuels Generation, Production and Distribution • E: Water supply, sewerage services, waste management and remediation activities • I: Accommodation and food service activities • R: Culture, sports and entertainment
		Social and training projects for mitigation of the consequences of the transition to climate neutral economy	<ul style="list-style-type: none"> • Social projects for persons, directly employed in coal mining and electricity from the extracted coal • Social projects for persons, affected from the transition to climate neutral economy 	<ul style="list-style-type: none"> • A: Agriculture, Forestry and Fishing • C: Processing industry • D: Electricity, Thermal Energy and Gaseous Fuels Generation, Production and Distribution • I: Accommodation and food service activities • J: Creation and distribution of information and creative products, Telecommunications • M: Professional, scientific and technical activities • N: Administrative and auxiliary activities • P: Education • Q: Human healthcare and social work • R: Culture, sports and entertainment
		Investments in manufactures/ services, based on the comparative advantages of the territory	Technologies in green energy, green tourism, organic farming, resource efficiency and waste management	<ul style="list-style-type: none"> • Green energy • Green tourism and organic farming • Resource efficiency (resource basis – agriculture, animal production, forestry, mineral resources, recycled materials, etc.) • Waste management and utilization

	Projects for remedying the consequences of coal mining and meeting the environmental standards	<ul style="list-style-type: none"> • Recultivation and utilization of disturbed sites after coal mining • Utilization and industrial reconversion of buildings and structures after coal mining and energy generation, using that coal 	<ul style="list-style-type: none"> • C: Processing industry • H: Transporting, Storage and Posts • J: Creation and distribution of information and creative products, Telecommunications • Q: Human healthcare and social work • R: Culture, sports and entertainment
Network/clusters of skilled, locally-based suppliers	Technologies in green energy, green tourism, organic farming, resource efficiency and waste management	<ul style="list-style-type: none"> • Green energy • Green tourism and organic farming • Resource efficiency (resource basis – agriculture, animal production, forestry, mineral resources, recycled materials, etc.) • Waste management and utilization 	<ul style="list-style-type: none"> • A: Agriculture, Forestry and Fishing • C: Processing industry • D: Electricity, Thermal Energy and Gaseous Fuels Generation, Production and Distribution • E: Water supply, sewerage services, waste management and remediation activities • I: Accommodation and food service activities • R: Culture, sports and entertainment
Development of competitively related industries, based on the technological and sectorial specialization of the region	Technologies in green energy, green tourism, organic farming, resource efficiency and waste management	<ul style="list-style-type: none"> • Green energy • Green tourism and organic farming • Resource efficiency (resource basis – agriculture, animal production, forestry, mineral resources, recycled materials, etc.) • Waste management and utilization 	<ul style="list-style-type: none"> • A: Agriculture, Forestry and Fishing • C: Processing industry • D: Electricity, Thermal Energy and Gaseous Fuels Generation, Production and Distribution • E: Water supply, sewerage services, waste management and remediation activities • I: Accommodation and food service activities • R: Culture, sports and entertainment

9. CONCLUSIONS REGARDING THE COAL-MINING REGION OF STARA ZAGORA

- Stara Zagora Region ranks second by economic significance in the South-eastern region in tier 2 following Burgas Region. It benefits from the location of the main axis of development between Plovdiv and Burgas;
- The transformation processes, which are now commencing in Stara Zagora, are at a much earlier phase than the situation in Bobov Dol and Pernik. The most severely affected municipalities in Stara Zagora Region are the Stara Zagora, Radnevo and Galabovo municipality. Stara Zagora is affected in terms of long commute, sub-supply chains and income. Apart from that the Radnevo and Galabovo municipalities are also affected as terrains for recultivation, reconversion of buildings, environmental issues;
- Stara Zagora, unlike Pernik has no larger centre nearby, and this acts as an advantage, because the workforce must find alternative employment within the same region and municipality. This is a strong localization incentive in the early phase of transition and an issue, if not enough activities occur, which would provide employment and just transition.
- The Radnevo and Galabovo municipalities are similar to Bobov Dol by profile, and failing to properly implement the projects from the territorial plans, these shall find themselves in an economic and demographic situation, similar to that in Bobov Dol;
- The number of employees in Stara Zagora in the coal mining industry and TPSs is approximately three times higher than the number of employees in Pernik and Bobov Dol together. The scale of the social challenges, however, is much larger than three times, since the Stara Zagora Region plays a much more important role for the national economy in terms of Gross Value Added, primary and secondary energy generation and energy security. A typical example of a problem of increasing scale;
- It is still not fully clear, how the two main financial sources (the Regions in Transition Programme 2021-2027 (this includes the Just Transition Fund) and the National Recovery and Sustainability Plan) address recultivation of open mines, which is the most serious environmental challenge.

PART VI. CONCLUSIONS FROM THE REPORT

- The socio-economic transitions are based on the technical and economic paradigms with a clear differentiation between evolutionary and revolutionary changes. **The logic of this report is based on the fact that the first economic transition, that commenced in Bulgaria in the beginning of the 1990s, was not based on the technical and economic paradigm, but was a *social-political choice*. A form of socio-political transformation, resulting to completely new socio-economic relations, asset and wealth allocation, and economic structure. This is an important condition for the proper understanding of the processes, detailed in the report. *This is also the basis for the main problem and challenge, that the social-political choice, has so far failed to produce a public mechanism, which could implement the inclusion of Bulgaria and its regions in the modern global and/or regional technical and economic wave, which would ensure the development of the Bulgarian regions in a manner that is more just.* As a result, Bulgaria entered a state of serious regional disparities – demographic, social, sectoral, environmental.**
- **It should further be noted that the target municipalities are considered municipalities with structural difficulties, and Bobov Dol Municipality has been identified as a rural municipality, as well. The administrative regions, to which these two municipalities (Pernik and Kyustendil) belong, experience the negative demographic processes, observed throughout Bulgaria, but here these are even more acutely manifested.**
- **At present Stara Zagora, economically, reports good development, and a process of economic diversification has commenced, but the transition to alternative economic activities will affect an extremely large number of workers, as well as the main electricity capacities of Bulgaria. These are two serious challenges, requiring proactive measures and solutions.**
- **The achievement of just transition to clean, circular economy in the context of the “Green Deal”, is viewed as a key counteraction to all potentially adverse processes. The investments in education, qualification and requalification are all part of the solutions for creating alternative employment for those, currently employed in the affected sectors. Our understanding is that this is a case of a process, which will reveal its benefits in at least 3 years.** The expectations for the possible changes on the labour market and employment, which will accompany the transition to a greener economy. We are steering the public towards thinking about and defining new “green” jobs, transforming these jobs to greener ones, as well as identifying the “green” workplace skills, which will be necessary for living and developing society and economy, preserving the resources and the environment.
- **It should be noted clearly that the activities, planned in the programme for development of the regions in programming period 2021-2027 (RDP), Priority 3 “Just Energy Transition”, include eligible activities that repeat the word investments. These are only possible in an appropriate investment environment, entrepre-**

neurship and readiness to take reasonable risk. In all other cases, public projects will dominate, which, however, are not equivalent to an investment and business environment for the so desirable micro-companies.

- The first just transition report for Southwest Bulgaria⁵⁷, the subsequent studies in Bulgaria⁵⁸, the European semester⁵⁹ and other documents reveal the scale of the forthcoming change. **In this respect, the approaches, used in other EU Member States, where just transition is programmed (Czechia, Poland, Romania, Slovakia), are more difficult to apply on the territories of Pernik and Bobov Dol municipalities, for the next at least 5 years. There are several reasons for that: the level of depopulation is higher than the rest, there is a severe impairment of the age and educational structures, and thus – of the quantity and quality of the workforce.** On the other hand, there is no manufacturing and technological industrial environment, infrastructure improves at slow rates, but logistics and business services are at very low level for the development of innovative and dynamic businesses. In most of the original business initiatives, we will rely on well-known, traditional activities, which can be launched with the available people and their respective qualifications.
- **The forthcoming restructuring of the capacities for electricity generation from coal will contribute to large-scale redundancies at these companies.** This would then affect all their sub-suppliers, as well as the tax revenues in the regions, the social-security and health insurance systems in Bulgaria. This poses the most significant social challenge and will contribute to further supply on the labour market of workers with secondary education, who are often incapable of finding equally paid jobs in other sectors within the same region or launch a business of their own. Therefore, they fall into the group at the highest risk of emigration and further aggravation of the demographic situation.
- The multiplier effect⁶⁰ with respect to the number of employees, determined based on the “input-output” table for Bulgaria for 2015.⁶¹ shows that one job in the energy products extraction sector supports at least 1,5 jobs in other economic sectors. The multiplier for the electricity generation sector is specified at 2,2 jobs. This proves the structural significance of both main economic activities in these regions. **Both sub-sectors on the territories of the three regions Pernik, Bobov Dol and Stara Zagora provide a total of 15,6 thousand jobs. Applying the multiplier effect, this value will increase by at least 27,3 thousand more jobs. The direct and additional adverse effects on employment, assessed in the report, show at least 43 thousand jobs affected, as about 73% of them will be in the Stara Zagora region**
- The observed retardation in the development of the Bobov Dol and Pernik Municipalities suggests a spatial-localization approach, which would contribute to changing the concept for the economic development of the region. In this respect, an approach is suggested for the spatial-time transformation with a combination

57. t.ly/9zJ1

58. Report on social challenges and re-skilling needs of the workforce solutions in the TRACER target regions, WP 3 – Task 3.5 / D 3.4 July 2020, TRACER website: www.tracer-h2020.eu

59. t.ly/DLvQ

60. Tool for determining and estimation of the jobs, used in the report, in order to provide projections of the future jobs, based on the current situation.

61. https://stats.oecd.org/Index.aspx?DataSetCode=IOTS14_2018

of various economic activities. **An assessment was made of those, who will be affected by the transition to clean, circular economy in order to determine the social-the demographic profiles of the population, which would be directly or indirectly affected by the transition to green economy, and identify the needs of new skills and support to the general principles of digitalization, circular economy, decarbonization, energy and resource efficiency, sustainable mobility.**

- Based on this information and on the basis of the priorities for the economic development of the regions, the development of regional plans for just transition started in 2020. These will be based on activities for inclusion in trainings for the acquisition of knowledge and skills, for which there is demand on the labour market, tools for the assessment and validation of the competences in order to provide alternative employment and entrepreneurship, will be applied. **The trainings of the workforce will be focused mainly in two directions:**

1) providing basic portable knowledge and skills for using the resources and environmental protection and climate, which form the basis for lifelong eligibility for employment and flexibility to changes; and

2) providing specific knowledge and skills, related to the successful exercising of professions, newly created green jobs or transformed jobs.

- The identification of sectors, which could change the socio-economic reality, is based on the economies of scale principle, resource efficiency, *threshold level and range of the business, hierarchy of the system of urban territories and their functions and Isard's substitution principle*. The expected number of new jobs at micro-companies is evaluated at approximately 150 for the Bobov Dol Municipality, 700 for Pernik and over 2000 for Stara Zagora, as these jobs can also be created through individual start-ups. All the other workers would have to be redistributed among existing companies or newly-established Small and Medium-Sized Enterprises, a process which will be relatively easier to implement on the territories of Pernik and Stara Zagora, as compared to Bobov Dol.
- **Identified are micro and small businesses, which can be launched immediately with available capital, based on personal skills, traditions, existing buildings, by adding high level of digitalization and online exposure in all its forms. The most important factor for development in people is the acquisition and enhancement of emotional intelligence and entrepreneurship, which mostly concerns small settlements, where investments will be minimum.**

Summing-up the conclusions, the report makes a clear differentiation between the centre of the municipalities and the villages, since the problems and solutions, applicable to the municipal centre, are incompatible with the solutions for villages, even within one and the same municipality, which constitutes further spatial disparities. Stara Zagora is a large administrative region, where a clear distinction can be made between the northern part, dominated by the Kazanlak municipality and specialized in machine engineering, the regional centre Stara Zagora, which is the economic core of the region, and the southern part, which contains the coal-mining and energy facilities. The solutions for Stara Zagora, must ensure continued growth for the centre and serious transformation for the territories of the Radnevo and Galabovo municipalities towards alternative development.

The key concept is a complete change of the attitude towards the existing resources – people, land, properties, forests, waters, energy potential, etc., along with the creation of completely new activities, *which do not conform to the economies of scale principle*, which is the sole condition for them to survive in the current complex environment. The report focuses on:

- The formation of a territorial system, based on the inner sharing of one or more settlements by creative, green, socially transforming and collectively learning communities, adding new value and organization of the life in these regions;
- Development of key competencies and entrepreneurship in the sectors – renewable energy, organic farming and organic foods, bioplastics, IT, resource efficiency (waters, biomass, treatment), circular economy, design.

*“We must say goodbye to coal,
there is no room for them, but we must provide
future for the coal-mining regions and the
transition must be just”.*

*„Bulgaria may become a green energy hub
for the entire region”*

Frans Timmermans

*“The cost of going green may be high,
but if we do nothing,
losses may be higher.”*

Vivian Loonela⁶²

62. t.ly/tCEs

SOURCES OF INFORMATION

Report of the Open Society Institute – Sofia (2018) When is Eastern Europe Going to Catch Up with Western Europe in Terms of Income? available at: https://osis.bg/wp-content/uploads/2018/05/convergence-final_May2018.pdf

European Council of the EU, Paris Agreement on Climate Change, website: <https://www.consilium.europa.eu/bg/policies/climate-change/paris-agreement/>

Bulgarian Regional Development Act, State Gazette, No. 50 of 30 May 2008, last amended and supplemented by SG No. 21 of 13 March 2020, available at: <https://www.mrrb.bg/bg/zakon-za-regionalnoto-razvities/>

NSI, Population by regions, municipalities, settlements and age as of 01.02.2011, available at: <https://www.nsi.bg/bg/content/3078/population-no-regions-municipalities-naceleni-mesta-i-vzrast-kbm-01022011-g>

NSI, Census of the population and housing in the Republic of Bulgaria 2011, available at: <https://www.nsi.bg/census2011/pagebg2.php?p2=175&sp2=192&SSPP2=194>

Ordinance No. 14 of 1 April 2003 on determining the urbanized areas in rural and mountainous regions, available at: <https://www.lex.bg/laws/ldoc/2135466072>

National Spatial Development Concept (NCSD) 2013-2025 – 2019 Update, available at: https://www.eufunds.bg/sites/default/files/uploads/oprd/docs/2020-05/0_ANKPR_CORRECTED_30.04.2020%20final.pdf

NSI, Macroeconomic statistics, source: https://infostat.nsi.bg/infostat/pages/module.jsf?x_2=6&lang=bg

Operational programmes funded by the EU, available at: www.eufunds.bg

EU policy, strategy and legislation for 2050 environmental, energy and climate targets, available at: https://ec.europa.eu/info/energy-climate-change-environment/overall-targets-and-reporting/2050-targets_bg

Porter, M. E., (2004) Competitive advantage of nations, Sofia

The regions development programme for programming period 2021-2027 (RDP), available at: http://www.bgregio.eu/media/Programirane/2021-2027/17.03.21-3177622_OPDR_Program_template_BG_VERSION_Jan%202021.pdf

Procedure No. BG16M1OP002-5.003 “Measures for the improvement Ambient Air Quality” within Priority Axis 5 “Ambient Air Quality Improvement” of Operational Programme „Environment 2014-2020”, available at: http://ope.moew.government.bg/files/useruploads/files/nasoki_measures_air_0512.pdf

Just transition for the coal-mining regions in Southwest Bulgaria: Development scenarios, available at: https://wwfeu.awsassets.panda.org/downloads/spravedliv_prehod_low_res_2.pdf

Stoychev, K. (2012) Localization approaches for regional development, University Publishing House „St. Kliment Ohridski“, Sofia, ISBN 978-954-07-3398-2, available at: http://www.suggfrpg.net/files/Location%20in%20RD_StudentCopy_web.pdf

Institute for Market Economics, website: <https://www.regionalprofiles.bg/bg/>

- Amin, Ash (1994). *Post-fordism: A Reader*. Blackwell Publishing. ISBN 0-631-18857-6.
- 2020 European Semester: National Reform Programmes and Stability/Convergence Programmes, EC website: <https://cutt.ly/jxFdrjQ>
- Just Transition A Report for the OECD (2017), website: <https://www.oecd.org/environment/cc/g20-climate/collapsecontents/Just-Transition-Centre-report-just-transition.pdf>
- International Labour Organisation, Decent work and just transitions must be at the heart of climate action, website: http://www.ilo.org/global/topics/green-jobs/news/WCMS_475064/lang--en/index.htm
- Guidelines for a just transition towards environmentally sustainable economies and societies for all, Copyright © International Labour Organization 2015, First published (2015), ISBN 978-92-2-130627-6 (print) 978-92-2-130628-3 (web pdf)
- Krugman, P. (1998), What's new about the new economic geography?, *Oxford Review of Economic Policy*
- New technologies: a jobless future or golden age of job creation? / Irmgard Nübler; International Labour Office, Research Department. – Geneva: ILO, 2016. (Research Department working paper; No. 13, ISSN: 2413-4589 (web pdf))
- Nübler I. (Nov, 2016), New technologies: A jobless future or a golden age of job creation?
- Organisation for Economic Co-operation and Development statistics, OECD website: https://stats.oecd.org/Index.aspx?DataSetCode=IOTSI4_2018
- Paul L. Hebert, Jane E. Sisk, and Elizabeth A. Howell (2008), When Does A Difference Become A Disparity? Conceptualizing Racial And Ethnic Disparities In Health, website: <https://www.healthaffairs.org/doi/full/10.1377/hlthaff.27.2.374>
- Report on social challenges and re-skilling needs of the workforce solutions in the TRACER target regions, WP 3 – Task 3.5 / D 3.4 July 2020, TRACER website: www.tracer-h2020.eu
- Spatial Development and Spatial Planning in Germany, Federal Office for Building and Regional Planning, Bonn (2001)
- Wikiwand, Central place theory, website: https://www.wikiwand.com/en/Central_place_theory



FROM COAL TO A MODERN ECONOMY

31,3%

of the overall energy balance
come from coal and coal-
based fuels

903 781 MWh

electricity per year will have to
be compensated by alternative
sources in case of closure
of TPP „Bobov dol“ and TPP
Republika - Pernik



15 600

jobs are currently provided
by the sectors „Production
of energy products “and“
Production of electricity “on
the territory of Pernik, Bobov
dol and Stara Zagora

1

workplace in sector
„Production of electricity “,
supports 2.2 workplaces in
the rest of the economy
sectors



Why we are here?

To stop the degradation of the planet's environment and to build
a future in which humans live in harmony with nature.

www.wwf.bg

ISBN 978-954-07-5252-5



9 789540 752525